FLORA OF PANAMA

Part VII. Fascicle 4*

ONAGRACEAE

By PHILIP A. MUNZ

Herbs or more rarely shrubs or even trees, with simple alternate or opposite, sometimes whorled leaves. Stipules lacking or small, caducous. Flowers mostly bisexual, axillary or in terminal racemes or paniculate clusters, the parts mostly in 4's, sometimes 2's, 5's or 6's. Floral tube** (hypanthium) adnate to ovary and usually prolonged beyond into a funnelform or tubular structure at the summit of which are the sepals, petals and stamens. Sepals 4, or 2, 5, or 6. Petals 4, or 2, 5, or 6. Stamens as many or twice as many as the petals, sometimes half as many; if of 2 series, those at the base of the petals often shorter. Anthers mostly linear, sometimes elliptical or subglobose, longitudinally dehiscent. Ovary inferior, 4, sometimes 2- or 5- or 6-loculed; style 1; stigma lobed or capitate or discoid. Fruit a capsule or berry or indehiscent and nutlike.

About 20 genera and 600 species of wide distribution, but especially west American.

a. Sepals persistent; floral tube not prolonged beyond the ovary.
  b. Stamens 8–12, in 2 series, an episepalous and an epipetalous.................. 1. JUSSIAEA
  bb. Stamens 3–6, in 1 series, episepalous.................. 2. LUDWIGIA
aa. Sepals deciduous after anthesis; floral tube prolonged beyond the ovary.
  b. Fruit a capsule, dehiscent; plants herbaceous.
    c. Flowers regular; stamens 8, all fertile.................. 3. OENOTHERA
    cc. Flowers irregular; stamens 2, 1 fertile and 1 petaloid.................. 4. LOPEZIA
  bb. Fruit a berry; plants shrubby or arborescent.................. 5. FUCHSIA

1. JUSSIAEA L.

JUSSIAEA L. Gen. Pl. ed. 5, 183 (no. 478), 1754.

Jussieua L. Gen. Pl. ed 1, 126. 1737.
Corynostigma Presl, Epim. Bot., 218. 1850.
Cubospermum Lour., Fl. Cochin., 275. 1790.
Oldenlandia P. Br., Hist. Jamaic., 208. 1756.

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* Assisted by a grant from The National Science Foundation.

** As used in this paper, "floral tube" will refer only to the free portion above the ovary and "ovary" will be applied to the adnate portion.

Issued October 15, 1959.

Herbs, shrubs or small trees with alternate, simple, membranaceous or rarely coriaceous leaves. Flowers yellow to white, on short or long pedicels, mostly in axils of more or less reduced upper leaves, hence sometimes paniculate; with 2 bracteoles on pedicel or ovary. Floral tube adnate to ovary and scarcely or not prolonged beyond it. Sepals 4–5 (–6), acute, persistent. Flowers regular; petals 4–5 (–6), caducous; stamens in 2 series, twice as many as petals and inserted with them under the margin of the epigynous usually hairy disc; filaments short; anthers ovate or oblong; pollen usually in tetrads. Ovary elongate, cylindrical or prismatic or obconic, 4–5 (–6) -loculed, with central placentation; style simple, more or less produced above the disc; stigma capitate, 4–5 (–6) -lobed. Ovules many. Capsule cylindrical, prismatic or obconic, 4–6-loculed, loculicidally and septicidally dehiscent. Seeds pluriseriate and naked, with prominent raphe, or uniseriate and surrounded by endocarp.

A genus of ca. 40 species, found in wet places in the warmer regions of Old and New Worlds, but concentrated in the American tropics and especially in Brazil. In recent years included by some writers in *Ludwigia*, and perhaps correctly so. American species of these genera seem to the author to fall into two distinct enough groups to merit generic status. Until more African and Asiatic plants can be studied, it seems best to maintain the present treatment.

a. Seeds multiseriate in each locule of the capsule, free (not enclosed in persistent endocarp); flowers mostly 4-merous, if 5-merous, then with capsule obconic or obpyramidal.
  b. Raphe distinctly smaller than the body of the seed; capsule obconic or obpyramidal (Section *Myrtocarpus*).
    c. Plants floating herbs, rooting freely along the stems.
      d. Leaves crowded in terminal rosettes, the blades rhombic-ovate, 0.5–2 cm. long, strigose beneath; seeds curved toward the apex. 1. J. SEDIOIDES
      dd. Leaves well distributed, the blades oblanceolate to obovate, 1–3 cm. long, glabrous; seeds straight.................... 2. J. INCLINATA
    cc. Plants erect or ascending, herbs or shrubs, not floating.
      d. Annual herbs with flat triangular bracteoles ca. 0.5 mm. long; capsules oblong-linear, sessile or short-pedicelled, 4–5-angled, 2.5–4 mm. broad.
        e. Leaves short-petioled; stems strongly angled; sepals 3–4 (–6) mm. long; petals 4–5 mm. long.................... 3. J. ERECTA
        ee. Leaves sessile; stems winged; sepals 7–10 mm. long; petals 8–12 mm. long.................... 4. J. DECURRENS
      dd. Perennial herbs or shrubs; bracteoles usually longer; capsules usually long-pedicelled (except in *J. latifolia*) and wider.
        e. Flowers small, sepals 4–5 mm. long; petals 4–6 mm. long; capsule almost round; pedicels 2–3 mm. long at anthesis.......... 5. J. LATIFOLIA
        ee. Flowers larger; sepals 8–18 mm. long; petals 10–27 mm. long; capsule more or less angled; pedicels 5–50 mm. long at anthesis.
          f. Principal lateral veins of leaf 6–12 on each side of midrib; stamens unequal, the episepalous somewhat longer than the epipetalous.
            g. Pedicels at anthesis 10–20 mm. long; style 1.5–2 mm. long between disc and stigma; seeds curving at apex; disc elevated; pedicels ascending.................... 6. J. NERVOSA
            gg. Pedicels at anthesis 5–12 mm. long; style 3–4 mm. long between disc and stigma; seeds straight; disc plane; pedicels tend to recurve in bud.................... 7. J. LITHOSPERMIFOLIA
          ff. Principal lateral veins of leaf 12–30 on each side of midrib; stamens subequal.

g. The lateral veins mostly 20–30 on each side of leaf-midrib; pedicels 1–2 cm. long at anthesis; bracteoles 1–1.5 cm. long at anthesis, to 2.5 cm. in fruit; petals 1–1.2 cm. long........ 8. J. FOLIOBRACTEOLATA

gg. The lateral veins 12–22 on each side of leaf-midrib; pedicels 2–3.5 cm. long at anthesis; bracteoles 0.5–1.2 cm. long; petals 1.2–2.7 cm. long........ 9. J. PERUVIANA

bb. Raphe so much enlarged as to be almost equal to the body of the seed; capsule cylindrical. (Section *Macrocarpon*)........ 10. J. SUFFRUTICOSA

aa. Seeds uniseriate in each locule of the capsule (except in upper portions of capsule of *J. linifolia*), each seed surrounded by persistent endocarp; flowers 5–6-merous (4-merous in *J. linifolia*). (Section 3. *Jussiaea*).

b. Flowers 4-merous; capsule somewhat enlarged toward the apex, the seeds uniseriate at base and enclosed in endocarp, multiseriate and not so enclosed above........ 11. J. LINIFOLIA

bb. Flowers 5–6-merous; seeds uniseriate throughout and enclosed in endocarp.

c. Seeds free in the horseshoe-shaped endocarp; petals 5–10 mm. long.

d. Leaves lanceolate to lance-linear, mostly 2–20 mm. wide; sepals 5–8 mm. long; disc flat; style 2–4 mm. long to base of stigma; raphe one-sixth to one-eighth of the width of the seed body........ 12. J. LEPTOCARPA

dd. Leaves ovate to elliptic, mostly 15–30 mm. wide; sepals 3.5–5 mm. long; disc elevated; style 1.5–2 mm. long below base of stigma; raphe one-third to one-fourth the width of the seed-body........ 13. J. AFFINIS

cc. Seeds grown fast to the endocarp, almost completely covered by it; petals 10–20 mm. long.

d. Petals white; leaf-blades almost round; floating plants with conspicuous spongy pneumatophores from the nodes........ 14. J. NATANS

dd. Petals yellow; leaf-blades usually definitely longer than broad; floating or erect, not usually showing nodal tufts of spindle-shaped pneumatophores.

e. Flowering stems usually erect, with lance-linear to narrowly oblong leaves; bracteoles lanceolate; capsules 3–4 mm. thick. 15. J. URUGUAYENSIS

ee. Flowering stems usually floating or creeping, with oblong leaves; bracteoles deltoid; capsules mostly 2–3 mm. thick........ 16. J. REPENS

1. JUSSIAEA SEDIOIDES Humb. & Bonpl., Pl. Aequin. 1:13–15, *pl. 3, A.* 1805.

Ludwigia sedioides Hara, Journ. Jap. Bot. 28:294. 1953.

Floating herb; stems slender, green, quite glabrous, rooting freely at nodes, with long quite naked branches and leaves crowded in terminal rosettes; petioles somewhat flattened, often reddish, glabrous or somewhat strigose beneath, 1–9 cm. long; leaf-blades rhombic-ovate, rather thick, acute at base, more obtuse at apex, crenate-serrate in upper half, minutely glandular-punctate, glabrous and shining above, finely strigose beneath, 5–20 mm. long and wide, with ca. 6 inconspicuous veins on each side of midrib and no submarginal vein; flowers solitary, in a few axils only; pedicels 1–3 cm. long; bracteoles swollen, less than 1 mm. long; sepals 4 (5), glabrous, oblong-ovate, obtusish to acute, 5-nerved, 6–8 mm. long, 3–5 mm. wide; petals yellow, round-obovate, emarginate, subsessile, 10–13 mm. long, 8–10 mm. wide; disc quite plane, hairy; stamens subequal, glabrous, the filaments white, somewhat widened basally, 3–4 mm. long; anthers 2 mm. long; style white, 3.5 mm. long; stigma subcapitate, somewhat 4-lobed, ca. 2 mm. wide; ovary obconic, 4-angled, glabrous, 8–10 mm. long; capsule narrowly obconic, 4-angled, glabrous, 10–13 mm. long, 3 mm. wide at summit, sometimes without median nerve on each face; seeds brown, shining, narrowly obovoid, curved at apex, ca. 0.6 mm. long, with inconspicuous raphe.

In quiet water. Cuba and Jamaica, Guatemala, Honduras and El Salvador, Panama, Colombia to Guiana, Brazil and Bolivia.

COCLÉ: Penonomé, *Williams 88*.

2. JUSSIAEA INCLINATA Link f., Suppl., 577. 1781.

Jussiaea inclinata var. *amazonica* Mich. in Martius, Fl. Bras. XIII, pt. 2:159. 1875.
J. repens var. *inflata* Wright ex Griseb., Cat. Pl. Cubens., 107. 1866.
Jussiaea inflata Wright, Jour. Linn. Soc. 10:478. 1869.

Floating herb; submerged stems strongly inflated, sparingly branched, rooting freely at nodes; emergent stems glabrous, simple, 5–15 cm. long; submerged leaves sometimes linear to narrowly oblanceolate, very thin, subsessile or very short-petioled, 1–3 cm. long, 0.2–0.7 cm. wide; aerial leaves broadly oblanceolate to obovate, acute at base, obtuse at apex, entire, glabrous, pellucid-punctate, thickish, shining, the blades 2–8 cm. long, 1–3 cm. wide, with 10–12 fairly prominent principal lateral veins on each side of midrib and with submarginal vein; petioles 1–2.5 cm. long, flattened; flowers occasional in upper axils; pedicels 0.3–0.7 cm. long, reflexed after anthesis; bracteoles at base of ovary, swollen, scarcely 1 mm. long; sepals 4, ovate, obtuse to acute, 5–10 mm. long, 2–6 mm. wide, 5–7-nerved; petals yellow, broadly obovate, 6–14 mm. long; disc almost plane, hirsute; stamens somewhat unequal, glabrous; filaments 3–6 mm. long; anthers 2–3 mm. long; style 3–5 mm. long; stigma 4-lobed, subcapitate, 2 mm. wide; ovary obconic, 4-angled, glabrous, 5–10 mm. long; capsule obconic, 4-angled (the angles almost wing-margined), 1–2 cm. long, 3–4.5 mm. wide, with median nerve on each face; seeds oblong, brownish, smooth, shining, 0.5 mm. long, straight, the raphe not very prominent.

In quiet water. Cuba and Isle of Pines, southern Mexico, El Salvador, Panama to Guiana and Brazil.

VERAGUAS: hills west of Soná, *Allen 1056*. PANAMÁ: swamp east of Río Tecumen, *Standley 26660*.

3. JUSSIAEA ERECTA L., Sp. Pl., 388. 1753.

Ludwigia erecta Hara, Journ. Jap. Bot. 28:292. 1953.
Jussiaea Onagra Mill., Gard. Dict., ed. 8, no. 4. 1768.
Jussiaea acuminata Swartz, Fl. Ind. Occ. 2:745. 1800.
Ludwigia acuminata Gomez, Anal. Hist. Nat. Madrid 23:66. 1894.
Jussiaea acuminata vars. *longifolia* & *latifolia* Griseb., Cat. Pl. Cubens., 107. 1866.
Jussiaea ramosa Jacq. f. ex Reichb., Ic. Bot. Exot., 54, no. 75. 1827.
Jussiaea erecta vars. *Sebana* and *Plumeriana* DC., Prodr. 3:55. 1828.
Jussiaea Plumeriana Bello, Anal. Soc. Esp. Hist. Nat. 10:267. 1881.
Jussiaea declinata Sessé & Moçiño, Fl. Mex., ed. 2, 110. 1894.

Erect annual, 4–25 dm. tall, freely branched, the branches nearly or quite glabrous, sharply angled from below the decurrent leaf-bases; leaves broadly to narrowly lanceolate, acute at both ends or acuminate at apex, glabrous except for the scabrellous margins and sometimes the veins on the under surface, subentire, with 16–25 fairly prominent veins on each side of the midrib and with submarginal vein; petioles 2–15 mm. long; principal cauline leaf-blades 5–13 cm.

long, 1–3 cm. wide, the uppermost and those on lateral branchlets much reduced, 2–4 cm. long; flowers solitary in uppermost axils, in an open paniculoid inflorescence, subsessile or on pedicels to 2 mm. long; bracteoles near base of ovary, scalelike, barely 0.5 mm. long; sepals 4, lance-ovate, sharply acute, puberulent, 3–4 mm. long; petals yellow, obovate, sessile, 4–5 mm. long; disc plane, almost glabrous; stamens subequal, glabrous, ca. 1.5 mm. long; anthers ca. 0.6 mm. long; style 1 mm. long; stigma capitate, 1 mm. thick; ovary oblong-linear, 4-angled, puberulent, 7–10 mm. long; capsule 4-angled, oblong-linear, puberulent, 12–16 mm. long, each face 2–2.5 mm. wide, with or without midrib; seeds yellow-brown, thick cylindro-ovoid, ca. 0.4 mm. long, minutely cellular-pitted under high magnification, with evident raphe.

Ditches and wet places. Southern Florida, West Indies, Mexico to Peru and Paraguay; also in tropics of Old World.

CHIRIQUÍ: Puerto Armuelles, *Woodson & Schery 830.* CANAL ZONE: Culebra, *Pittier 2111;* Corozal, *Piper 5298.* PANAMÁ: San José Island, Perlas Archipelago, *I. M. Johnston 1107.*

4. JUSSIAEA DECURRENS (Walt.) DC., Prodr. 3:56. 1828.

Ludwigia decurrens Walt., Fl. Carol., 89. 1788.
Ludwigia uniflora Raf., Med. Repos. N. Y. 5:358. 1808.
Jussiaea palustris G. F. W. Meyer, Prim. Fl. Esseq., 173. 1818.
Ludwigia jussiaeoides Michx., Fl. Bor. Am. 1:89. 1820.
Jussiaea tenuifolia Nutt., Am. Jour. Sci. 5:294. 1822.
Jussiaea alata G. Don, Gen. Syst. 2:693. 1832.
Jussiaea alata Presl, Rel. Haenk. 2:34. 1835.
Jussiaea pterophora Miq., Ann. Mag. Nat. Hist., ser. 1, 11:13. 1843.
Jussiaea Bertonii Lévl. in Bertoni, Descr. Fís. Econ. Paraguay, 2. 1910.

Erect annual, 3–20 dm. tall, glabrous, freely branched; roots often spongy, inflated; stems mostly 4-winged, 2 wings from each of the decurrent leaf bases, the wings to 2 mm. wide, membranous; leaves lanceolate (uppermost almost linear, basal broadly lanceolate), membranaceous, shining, quite glabrous except for the ciliolate margins and minute appressed hairs beneath, subsessile, acute or somewhat rounded at the base, gradually attenuate into an acute apex, subentire, the veins prominent, the principal lateral veins 11–16 on each side of the midrib, submarginal vein developed; principal cauline leaves 5–12 cm. long, 1–3.5 cm. wide, the upper reduced; flowers solitary in upper axils; pedicels 1–5 (–10) mm. long, 4-angled or -winged; bracteoles at base of ovary, deltoid-ovate, less than 1 mm. long, thickened; sepals 4, green, ovate-lanceolate, acuminate, minutely puberulent, scabrellous-ciliate, 3–5-nerved, 7–10 mm. long; petals yellow, obovate, sessile, entire, 8–12 mm. long; disc plane, pubescent; stamens unequal, glabrous, the filaments 1.5–2.5 mm. long, the anthers 1 mm. long; style 1.5–2 mm. long; stigma capitate, 1.5–2 mm. thick; ovary narrowly obconic, 4-angled or -winged, minutely puberulent, 8–10 mm. long; capsule elongate clavate-obpyramidal, 4-angled or narrowly winged, mostly 12–20 mm. long, each face with a more or less obsolete midrib and 3–4 mm. wide; seeds subcylindric, obtuse at both ends, yellowish, 0.3–0.4 mm. long, minutely cellular-pitted under magnification, the raphe evident.

Wet places. Southeastern United States, West Indies, Guatemala to Peru, Uruguay and northern Argentine.

BOCAS DEL TORO: Isla Colon, near Chiriquí Lagoon, *H. von Wedel 2853*; Water Valley, near Chiriquí Lagoon, *H. von Wedel 1667*; Changuinola Valley, *V. C. Dunlap 219*. CANAL ZONE: Barro Colorado Island, *L. H. & E. Z. Bailey 384*. COCLÉ: Aguadulce, *Pittier 4925*.

5. JUSSIAEA LATIFOLIA Benth. in Hook. Jour. Bot. 2:317. 1840.

Ludwigia latifolia Hara, Journ. Jap. Bot. 28:292. 1953.
Jussiaea geminiflora J. Donnell Smith, Bot. Gaz. 23:246. 1897.

Herbaceous to arborescent, 1–5 m. high, branching freely, the branchlets subterete, subglabrous except finely puberulent when younger; main trunk to 1 dm. in diameter; petioles 5–15 mm. long; leaf-blades ovate to broadly lanceolate, acuminate at both ends, thin, nearly glabrous to finely puberulent above especially on veins, subglabrous beneath except on the pubescent veins, shining, somewhat bicolored, 5–15 cm. long, with 18–30 principal veins on each side of midrib and with evident submarginal vein; leaves not much reduced up the stem; stipules glandular-setaceous, subulate; flowers 1 or 2 in each upper leaf axil; pedicels puberulent, 2–3 mm. long at anthesis, 3–5 mm. in fruit; bracteoles lance-linear, puberulent, obtusely 4-angled, obconic, 4–5 mm. long; sepals lance-deltoid, acute to acuminate, more or less glandular-serrulate, 4–5 mm. long, somewhat more in fruit; petals yellow, round-obovate, 4–6 mm. long; disc somewhat elevated, pilose; stamens subequal, the filaments flattened, ca. 2 mm. long; anthers slightly longer; style barely 1 mm. long; stigma subglobose, ca. 1.5 mm. thick; ovary obconic, obtusely 4-angled, 4–5 mm. long; capsule subglobose to oblong, scarcely angled, subglabrous to slightly puberulent, 6–12 mm. long; seed oblong-obovoid, 0.6–0.7 mm. long, light brown, shining, obscurely punctate, the raphe not prominent.

Wet places. Costa Rica to northern Brazil and adjacent Peru.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 96*; Water Valley, *H. von Wedel 781* and *1534*; Western River near Chiriquí Lagoon, *H. von Wedel 2779*; Chiriquí Lagoon region, Punta Rovalo to Rovalo River, *Seibert 1559*; near Chiriquí Lagoon, *H. von Wedel 1384*.

6. JUSSIAEA NERVOSA Poir. in Lamarck, Encycl. Suppl. 3:199. 1813.

Ludwigia nervosa Hara, Journ. Jap. Bot. 28:293. 1953.
Jussiaea maypurensis H.B.K., Nov. Gen. et Sp. 6:100. 1823.
Jussiaea palmitensis Camb. in St. Hil., Fl. Bras. Merid. 2:261. 1829.
Jussiaea rigida Miquel, Stirp. Surinam, 58. 1851.
Jussiaea nervosa var. *glaberrima* Mich. in Martius, Fl. Bras. XIII, pt. 2:156. 1875.

Shrubby or arborescent, 1–6 m. tall (usually 1.5–3 m.), erect, freely branched, the young branchlets somewhat angled, finely puberulent; leaves fairly crowded, gradually reduced up the stems, the uppermost scarcely more than leafy bracts, all sessile or nearly so, lanceolate to lance-oblong, glabrous or more or less puberulent or pubescent along veins of under surface, coriaceous, subentire, inconspicuously gland-serrulate on margin, veins prominent especially beneath, with about 6–12 principal lateral ones on each side of midrib and other minor ones between, the

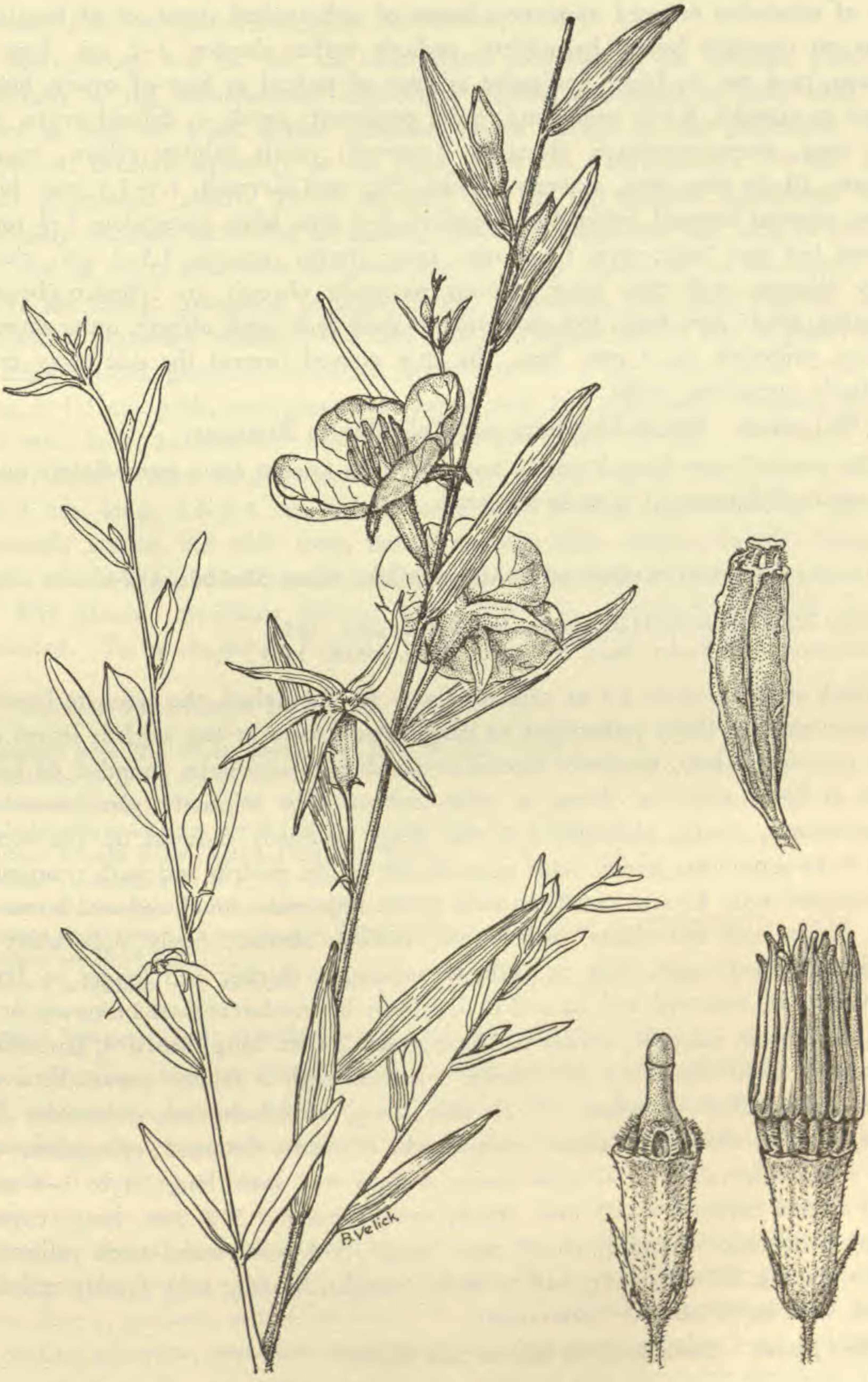

Fig. 94. *Jussiaea lithospermifolia*

submarginal vein conspicuous; principal leaves 3–9 cm. long; flowers solitary in axils of somewhat reduced uppermost leaves of unbranched stems, or of bracteate leaves on crowded lateral branchlets; pedicels rather slender, 1–2 cm. long at anthesis, to 4 cm. in fruit; bracteoles at apex of pedicel or base of ovary, linear, adnate to stipules, 0.5–2 mm. long, quite persistent; sepals 4, deltoid-ovate, 6–9 mm. long, short-acuminate, obscurely 5-nerved; petals sulphur-yellow, round-obovate, 10–20 mm. long, scarcely clawed; disc well elevated, 1.5–2.5 mm. high, pilose; stamens unequal, episepalous filaments 4–5 mm. long, epipetalous 2–3 mm.; anthers 3–4 mm. long; style 1.5–2 mm. long; stigma capitate, 1.5–2 mm. thick; ovary obconic, 4–8 mm. long; capsule narrowly obconic to cylindro-obconic, 4-angled, 10–15 mm. long, 4–6 mm. wide on each face; seeds oblong, quite smooth, shining, yellowish, ca. 1 mm. long, the apex curved toward the side away from the fairly prominent raphe.

Wet places. British Honduras and Colombia to Paraguay.

No material seen from Panama, but since it is known from immediately north and south of Panama, it is to be expected.

7. JUSSIAEA LITHOSPERMIFOLIA Kunth in Mich., Flora 57:300. 1874.

Ludwigia lithospermifolia Hara, Journ. Jap. Bot. 28:292. 1953.
Jussiaea yacumensis Rusby, Mem. N. Y. Bot. Gard. 7:316. 1827.

Herb or shrub up to 2.5 m. tall, relatively few-branched, the ultimate branchlets very slender, finely puberulent to subglabrous, more or less angled; leaves not very crowded, sessile, narrowly lanceolate to oblong-lanceolate, rounded to long-acute at base, acute to obtuse at apex, subentire or minutely gland-serrulate, subcoriaceous, mostly glabrous, 2–7 cm. long, gradually reduced up the stems, with 9–10 prominent lateral veins on each side of the midrib and with prominent submarginal vein; flowers usually in axils of the uppermost much reduced leaves on very slender side branchlets, rather few; pedicels slender, finely puberulent to subglabrous, 5–12 mm. long at anthesis, somewhat thicker and longer in fruit, tending to be recurved and secund in the bud; bracteoles at base of ovary or at apex of pedicels, subulate, adnate to the stipules, 1 mm. long; sepals 4, lanceolate, acuminate, 8–10 mm. long at anthesis, 3-nerved with 2 fainter nerves between; petals light yellow to white, 13–20 mm. long, round-obovate, subsessile; disc pilose, scarcely elevated; stamens unequal, the filaments flattened, episepalous 4–5 mm. long, epipetalous 2.5–3 mm. long; anthers 4–5 mm. long; style 3–4 mm. long; stigma capitate, ca. 2 mm. thick; ovary obconic, 5–7 mm. long; capsule narrowly obconic, 4-angled, 10–12 mm. long, 3.5–5 mm. wide; seeds yellowish-brown, oblong, 0.7 mm. long, half as wide, straight, shining, very faintly cellular-pitted, with raphe not very prominent.

Wet places. Costa Rica to Bolivia and Brazil.

CHIRIQUÍ: Boquete, *Davidson 694*. VERAGUAS: hills west of Soná, *Allen 1055*. COCLÉ: mountains beyond La Pintada, *Hunter and Allen 527*. CANAL ZONE: Chiva-Chiva Trail, Red Tank to Pueblo Nuevo, *Piper 5747*.

8. JUSSIAEA FOLIOBRACTEOLATA Munz, Darwiniana 4:228–230. 1942.

Ludwigia foliobracteolata Hara, Journ. Bot. 28:292. 1953.

Suffruticose, 1–2 m. tall, the older stems subglabrous, the younger pubescent especially in the inflorescence; leaf-blades elliptic, acuminate at both ends, 2–5 times as long as wide, almost glabrous above except on the pubescent veins, pubescent beneath especially on the veins, 7–20 cm. long; petioles 1–4 cm. long; veins prominent, mostly 20–30 on each side of the midrib; uppermost leaves gradually reduced, each with an axillary flower; pedicels 1–2 cm. long in anthesis, 2–3 cm. in fruit; bracteoles on lower part of ovary (one-third to one-fourth way above the base), lanceolate to round-ovate, foliaceous, free from stipules, rather persistent, pinnately veined, 1–1.5 cm. long at anthesis, to 2.5 cm. in fruit; sepals 4, lance-deltoid, glandular-serrulate, acuminate, ca. 1 cm. long; petals 1–1.2 cm. long, 1–1.5 cm. wide, emarginate, the broad claw 2–3 mm. long; filaments dilated, 2–3 mm. long; anthers 2–3 mm. long; disc somewhat elevated, 1–1.5 mm. high, pilose; style 1 mm. long; stigma ca. 2 mm. thick; capsule somewhat 4-angled, 1.5–2 cm. long, 0.6–0.8 cm. thick; seeds light brown, asymmetrically obovoid, obscurely striate, 0.8 mm. long, curved on one edge, almost straight along the raphe which is one-third to one-half as wide as the body of the seed.

Wet places. Southern Mexico and Costa Rica, Venezuela, British Guiana, Trinidad. To be sought in Panama.

9. JUSSIAEA PERUVIANA L., Sp. Pl., 388. 1753.

Ludwigia peruviana Hara, Journ. Jap. Bot. 28:293. 1953.
Oenothera hirta L., Sp. Pl. ed. 2, 491. 1762.
Jussiaea hirta Sw., Obs., 142. 1791.
Ludwigia hirta Gomez, Anal. Hist. Nat. Madrid, 23. 1894.
Jussiaea hirsuta Miller, Gard. Dict., ed. 8, no. 5. 1768.
Jussiaea grandiflora R. & P., Fl. Peruv. 4:382. 1802.
Jussiaea macrocarpa H.B.K., Nov. Gen. et Sp. 6:102. 1823.
Jussiaea peruviana var. *macrocarpa* Bertoni, Descr. Fis. Econ. del Paraguay, 13. 1910
Jussiaea mollis H.B.K., l.c.
Jussiaea peruviana var. *australis* Hassler f. *hirsuta* Hassler and f. *tomentosa* Hassler, Fedde Repert. 12:269. 1913.
Jussiaea Sprengeri Hort. ex Bailey, Stand. Cyclopedia, 1730. 1915.

Suffruticose herb or shrub, 0.6–3 m. high, rarely subscandent and up to 6 m. tall, more or less hirsute-pubescent throughout, usually somewhat tawny, with open branching, the younger branchlets more or less angled; leaf blades ovate- to lance-elliptic, 3–4 times as long as wide, acute to acuminate at both ends, with 12–22 main veins on each side of the midrib, subentire, scabrous-puberulent to soft-hairy, especially beneath and along the veins, 5–15 cm. long, gradually reduced up the stem; petioles 3–10 (–15) mm. long; flowers solitary in upper axils; pedicels 20–25 mm. long at anthesis, somewhat longer in fruit; bracteoles at upper part of pedicel or on base of ovary, lanceolate to oblanceolate, free from stipules, 5–12 (–18) mm. long; sepals 4 (5), lanceolate, acuminate, more or less glandular-serrulate, 10–18 mm. long, not much enlarged in fruit; petals pale to deep yellow, round-obovate, 12–27 mm. long, emarginate, with broad claw 1.5–3 mm. long; stamens subequal, filaments flattened, 2–3.5 mm. long; anthers 3–4.5 mm. long; disc pilose, elevated, 1–2 mm. high; style ca. 1 mm. long; stigma 2–3 mm. long; capsule 4-angled, obconic, 12–30 mm. long, 8–10 mm. thick, usually somewhat constricted at apex; seeds light brown, compressed-obovoid, 0.6–0.8 mm. long, indistinctly striate and regularly and shallowly cellular-pitted, raphe one-fourth to one-fifth the width of the body.

Wet places. From Florida and Mexico to Argentina.

BOCAS DEL TORO: Robalo Trail, north slope of Cerro Horqueta, *Allen 4945*. CHIRIQUÍ: Llanos del Volcán, *Seibert 335*; Chiquero, Boquete District, *Davidson 551*; Boquete, *Woodson & Schery 711*. COCLÉ: Llano Bonito, north of Las Margaritas, *Seibert 535*; Penonomé, *R. S. Williams 146*; El Valle de Antón, *Allen 1982, Hunter & Allen 374*, and *Seibert 489*; marshes near Río Antón, *Allen 2815*; near Antón, *Woodson, Allen & Seibert 1707*.

10. JUSSIAEA SUFFRUTICOSA L. var. OCTOFILA (DC.) Munz, Darwiniana 4:239. 1942.

Jussiaea octofila DC., Prodr. 3:57. 1828.
Jussiaea peruviana var. *octofila* Bertoni, Descr. Fís. Econ. del Paraguay, 13. 1910.
Jussiaea pubescens L., Sp. Pl., ed. 2, 555. 1762.
Ludwigia pubescens Hara, Journ. Jap. Bot. 28:293. 1953.
Jussiaea calycina Presl, Rel. Haenk. 2:34. 1835.
Jussiaea hirsuta Presl, l.c.
Jussiaea Haenkeana Steud., Nomen. ed. 2, 1:836. 1840.
Jussiaea venosa Presl, l.c.
Jussiaea occidentalis Nutt. ex T. & G., Fl. N. Am. 1:521. 1840.
Jussiaea clavata Jones, Contrib. W. Bot. 15:131. 1929.

Herb or shrub 0.6–2.5 m. tall, erect, branched above or throughout, pubescent on stems and leaves; leaves lanceolate to lance-ovate, 2–6 (–10) cm. long, 0.8–1.5 (–2.5) cm. wide, mostly sessile or short-petioled, acute at base, acutish to acuminate at apex, membranaceous, subentire, only gradually reduced up the stem, lateral veins 15–20 on each side of the midrib, with well developed submarginal vein; flowers solitary in uper axils; pedicels mostly 4–12 mm. long in fruit; bracteoles on upper part of pedicel or on base of ovary, setaceous, 1–3 mm. long; sepals 4, ovate to lance-ovate, 7–8 mm. long, pubescent, 5-nerved; petals deep yellow, cuneate-obovate, scarcely clawed, 1–2 cm. long; disc scarcely elevated, hairy; stamens slightly unequal, glabrous; filaments widened basally, 2.5–3.5 and 1.5–2.5 mm. long; anthers 2–3 mm. long; style thick, 1.5–3 mm. long; stigma subcapitate, slightly lobed, 2.5–3 mm. thick; ovary clavate-cylindric, mostly 10–15 mm. long; capsules cylindric to clavate-cylindric, 8-nerved, obtusely 4-angled, 2.5–5 cm. long, 2.5–3.5 mm. wide; seeds rounded, brown, shining, 0.6 mm. long, the raphe as wide as the body.

Wet places. Southeastern United States and West Indies, Mexico to Venezuela and eastern Peru.

BOCAS DEL TORO: Changuinola River, *Dunlap 464*; Water Valley, *H. von Wedel 993*; southwest of Bocas at Macaw Hills, Isla Colon, *H. von wedel 546*. CHIRIQUÍ: Boquete, *M. E. Davidson 694*.

More common in Panama is

10a. JUSSIAEA SUFFRUTICOSA var. LIGUSTRIFOLIA (H.B.K.) Griseb., Mem. Am. Acad., n. ser., 8:187. 1860.

Jussiaea ligustrifolia H.B.K., Nov. Gen. et Sp. 6:100. 1823.
Ludwigia pubescens var. *ligustrifolia* Hara, Journ. Jap. Bot. 28:293. 1953.
Oenothera octovalvis L., Sp. Pl. ed. 2, 492. 1762.
Jussiaea octovalvis, Sw. Obs. Bot., 142. 1791.
Jussiaea angustifolia Lam., Encyc. 3:331, t. 280. 1789.
Jussiaea suffruticosa var. *angustifolia* O. Kuntze, Rev. Gen. 1:251. 1891.
Ludwigia angustifolia Gomez, An. Hist. Nat. Madrid. 23:66. 1894.
Jussiaea octonervia Lam., Encyc. 3:332, t. 280. 1789.
Jussiaea suffruticosa var. *octonervia* Bertoni, Descr. Fís. Econ. del Paraguay, 17. 1910.
Jussiaea frutescens Jacq. f., Sem. Hort. Vind. (1821); ex DC., Prod. 3:56. 1828.
Jussiaea persicariaefolia forma *major* Schlecht, Linnaea 12:271. 1838.
Jussiaea Sagreana A. Rich., Ess. Fl. Cub., 534. 1845.
Ludwigia Sagreana Gomez, l.c.
Jussiaea suffruticosa var. *Sintenisii* Urb., Symb. Ant. 4:469. 1910.

Stems glabrous to strigulose especially in younger parts; leaves lanceolate to ovate, usually acute to acuminate, glabrous to somewhat strigulose, 3–12 cm. long, 0.7–2.2 cm. wide, subsessile to short-petioled (–8 mm.); fruiting pedicels generally 5–10 mm. long; bracteoles on base of floral tube, setaceous, 1–3 (–5) mm. long; sepals ovate, acuminate, 8–12 mm. long.

West Indies and Mexico to Peru and Paraguay; also in Old World.

BOCAS DEL TORO: Water Valley near Chiriquí Lagoon, *H. von Wedel 749* and *1682*; Old Bank Island near Chiriquí Lagoon, *H. von Wedel 2002* and *2054*; Changuinola Valley, Island Potrero, *Dunlap 213*. CHIRIQUÍ: Puerto Armuelles, *Woodson & Schery 829*; Boquete, *M. E. Davidson 650*. COCLÉ: Valle de Antón, *Seibert 441*. PANAMÁ: near Arraiján, *Woodson, Allen and Seibert 1349, Allen 1627*; Arenoso, *Seibert 618*. CANAL ZONE: Barro Colorado Island, *Shattuck 592, Aviles 880* and *911, Dodge 3457*; Gatun Lake, *Wetmore & Abbe 27*; Quebrada La Palma, *Dodge & Allen 17345*; Las Cruces Trail, *Hunter & Allen 743*; Chagres, *Fendler 114*.

Plants with narrower lance-linear leaves, 2–5 mm. wide are forma LINEARIFOLIA (Hassler) Munz, Darwiniana 4:243. 1942. [*J. suffruticosa* var. *linearifolia* Hassler, Fedde Repert, 12:277. 1913. *J. salicifolia* H.B.K., Nov. Gen. et Sp. 6: 99. 1823. *J. parviflora* Camb. in St. Hilaire, Fl. Bras. Merid. 2:263. 1829. *J. suffruticosa* var. *angustifolia* Chod. & Hassler, Bull. Herb. Boiss. ser. II, 3:909. 1903, not O. Kuntze, Rev. Gen. 1:251. 1891.] It has the range of the var. *ligustrifolia.*

COCLÉ: Valle de Antón, *Seibert 441*; Porto Posada near Penonomé, *Williams 159*. PANAMÁ: road to Chepo, *Hunter & Steyermark* in *1935*.

11. JUSSIAEA LINIFOLIA Vahl, Eclog. Am. 2:32. 1798.

Jussiaea micrantha Kunze, Linnaea 24:177. 1851.
Ludwigia micrantha Hara, Journ. Jap. 28:293. 1953.
Jussiaea Weddellii Micheli, Flora 57:301. 1874.

Erect annual, 2–20 dm. tall, subglabrous, usually freely branched, the branches wing-angled from below the decurrent leaf bases; leaves lanceolate to ovate, gradually narrowed at base into flattened petioles 2–20 mm. long, acute to subacuminate, pellucid-punctate, membranaceous, glabrous except for minute pubescence on scabrellous margins and veins of under surface or scattered over both surfaces, subentire, with ca. 12–16 main veins on each side of midrib and with poorly developed submarginal vein; principal cauline lvs. 3–10 cm. long, 1–3 cm. wide, gradually reduced up the stem; flowers white, many, solitary in upper axils, arranged in subpaniculate puberulent inflorescence, subsessile; bracteoles triangular, adnate to stipules, scalelike, 0.5–1 mm. long, high on ovary; this linear, enlarged above, 4-angled, puberulent, ca. 8 mm. long; sepals 4, lanceolate, 3-nerved, acuminate, 2.5–3.5 mm. long; petals 4, elliptic, entire, 3 mm. long; disc plane; filaments unequal, slender, 1 and 2 mm. long; anthers barely 0.5 mm. long; style slender, 1.5 mm. long; stigma subcapitate, less than 1 mm. thick; capsule sublinear, slightly enlarged in upper fifth to half, subterete, 18–25 mm. long, 1.5–2 mm. thick, fairly thick-walled and slow to dehisce below, membranaceous and easily dehiscent above; seeds usually pluriseriate in upper part, subhorizontal, oblong-ovoid, ca. 0.5 mm. long, yellowish, minutely cellular-punctate under magnification, with evident raphe; lower seeds uniseriate, almost pendulous, 0.7 mm. long, oblong-ovoid, cellular-punctate, with well developed raphe and embedded in a persistent corky thick angled endocarp.

Moist places. West Indies and southern Mexico to Peru and Brazil. Old World. No material seen from Panama, but the species is known to occur in Costa Rica and northern Colombia.

12. JUSSIAEA LEPTOCARPA Nutt., Gen. N. Am. 1:279. 1818.

Ludwigia leptocarpa Hara, Journ. Jap. Bot. 28:292. 1953.
Jussiaea pilosa H.B.K., Nov. Gen. et Sp. 6:101. 1823.
Jussiaea variabilis var. *pilosa* O. Kuntze, Rev. Gen. 1:251. 1891.
Jussiaea Schottii Micheli, Flora 57:302. 1874.
Jussiaea surinamensis Miq., Linnaea 18:370. 1844.
Jussiaea pilosa var. *robustior* J. Donn. Smith, Bot. Gaz. 16:6. 1891.
Jussiaea pilosa var. *pterocarpa* Hassler, Fedde Repert. 12:274. 1913.
Jussiaea pilosa var. *glabra* Hoehne, Exped. Sci. Roosevelt-Rondon Annexo 2:62. 1914.

Annual or perennial herb or shrub, 0.3–2 m. tall, freely branched, bushy, the younger branches angled even almost winged from below the decurrent leaf bases, pilose and minutely puberulent; leaves numerous, lanceolate, acute or obtuse, minutely scabrellous-puberulent, often almost strigose or pilose, especially on the veins of the under surface; main leaves 4–14 cm. long, 0.7–2.8 cm. wide, with 11–20 principal veins on each side of the midrib and with poorly developed submarginal vein, subsessile to petioled (to 2 cm. long); flowers solitary in upper axils, rather numerous; pedicels becoming 3–15 mm. long in fruit; bracteoles at upper end of pedicel, adnate to stipules, squamate, ca. 0.5 mm. long; sepals 5–6, lanceolate, acuminate, 5–8 mm. long, inconspicuously 3-nerved; petals whitish to deep yellow, round-obovate, 5–10 mm. long, short-clawed; disc flat, pilose; stamens unequal, glabrous, the episepalous filaments 2.5–4.5 mm. long, the epipetalous 1.5–2.5 mm.; anthers ca. 1 mm. long; style 2–4 mm. long; stigma capitate, 1–1.5 mm. thick; ovary linear, subterete, 10–16 mm. long, pilose and puberulent; capsule subcylindric, 10–12-nerved, straight or curved, rather abruptly narrowed at base, 18–45 mm. long, 2.5–3 mm. thick, puberulent and pilose; seeds subhorizontal, in 1 series in each locule, flattened-ovoid, yellowish, 1 mm. long, minutely cellular-punctate under magnification, surrounded by the horseshoe-shaped corky endocarp but free in it; raphe one-sixth to one-eighth as wide as the body of the seed.

Wet places. Southeastern United States and West Indies, Mexico to Peru and Argentina.

COCLÉ: near Antón, *Woodson, Allen & Seibert 1708*. CANAL ZONE: Barro Colorado Island, *Wetmore & Abbe 189, Woodworth & Vestal 533, Bailey 650*; Gigante Bay, *Dodge 3473*; Gamboa, *Allen 1974*.

12a. **JUSSIAEA LEPTOCARPA** var. **MEYERIANA** (O. Kuntze) Munz, Darwiniana 4: 258. 1942.

Jussiaea variabilis var. *Meyeriana* O. Ktze., Rev. Gen. Pl. 1:251. 1891.
Jussiaea variabilis Meyer, Primit. Fl. Essequeb., 174. 1818.
Jussiaea aluligera Miq., Stirp. Surinam Sel., 60. 1851.

Plant glabrous; fruiting pedicels 1–5 mm. long.

West Indies, Panama to Guiana and Brazil.

CHIRIQUÍ: Boquete, *Woodson & Schery 712, Davidson 650*.

13. **JUSSIAEA AFFINIS** DC., Prodr. 3:53. 1828.

Jussiaea variabilis Mey. var. *affinis* O. Kuntze, Rev. Gen. Pl. 1:251. 1891.
Ludwigia affinis Hara, Journ. Jap. Bot. 28:291. 1953.
Jussiaea micropetala Martius, Flora 22: Beibl. 1:61. 1839.
Jussiaea hexamera Miq., Ann. Sci. Nat., Ser. III, 1:36. 1844.
Jussiaea ferruginea Rusby, Bull. N. Y. Bot. Gard. 8:110. 1912.

Herbs or straggling half shrubs, 0.5–2.5 m. tall, supported by surrounding plants, openly branched, the branches slender, hirsute-pilose with brownish hairs, angled; leaves ovate to elliptic, acute at base and rather abruptly narrowed into petioles 3–10 (–25) mm. long, abruptly acute or obtusish at apex, membranaceous, entire, minutely pellucid-punctate, pilose on both surfaces, with 10–25 rather conspicuous veins on each side of midrib and rather inconspicuous submarginal vein; leaf blades 2–8 (–12) cm. long, 1.5–3 (–6) cm. wide, the uppermost somewhat smaller; flowers solitary in leaf axils; pedicels 1–3 mm. long; bracteoles at base of ovary, squamate, triangular, apparently adnate to stipules, less than 0.5 mm. long; sepals 5–6, lance-ovate, acute, 3.5–5 mm. long, 1.5 mm. wide, obscurely 3-nerved; petals yellow, narrowly obovate, 6–8 mm. long; disc elevated, pilose; stamens unequal, the filaments flattened basally, 1.5 and 3 mm. long; anthers ca. 1 mm. long; style 1.5–2 mm. long; stigma capitate, barely 1 mm. thick; ovary usually short-hirsute, linear, cylindrical, 5–6-nerved, 10–12 mm. long; capsules cylindrical, 10–12-nerved, 20–35 mm. long, 2.5–3 mm. thick; seeds thick-ovoid, yellowish, ca. 1 mm. long, obscurely cellular-pitted under magnification, the raphe one-third to one-fourth as wide as the body, seed enveloped in the horseshoe-shaped corky endocarp.

Wet places. Southern West Indies and Guatemala to Peru, Bolivia and Brazil.

BOCAS DEL TORO: Old Bank Island near Chiriquí Lagoon, *H. von Wedel 1884* and *2162*. COCLÉ: Penonomé, *R. S. Williams 392*. CANAL ZONE: Chagres, *Fendler 115*.

13a. JUSSIAEA AFFINIS var. DODECANDRA (DC.) Munz, Darwiniana 4:261. 1942.

Jussiaea dodecandra DC., Prodr. 3:53. 1828.

Young stems, floral tubes and sepals minutely puberulent.

Costa Rica to Guiana.

BOCAS DEL TORO: Changuinola River, *Dunlap 391.*

14. JUSSIAEA NATANS Humb. & Bonpl., Pl. Aequin. 1:16. 1808.

Jussiaea natans var. *emersa* Hassler, Fedde Repert. 12:276–277. 1913.
Jussiaea helminthorrhiza Martius, Flora 22: Beibl. 1:61. 1839.
Ludwigia helminthorrhiza Hara, Journ. Jap. Bot. 28:292. 1953.

Perennial herb, floating or prostrate on mud, rooting at nodes, some of the roots slender, branched, others apparently converted into spongy masses or pneumatophores 2–4 mm. thick and spindle-shaped; stems glabrous, few branched, leafy, scarcely if at all angled; leaves suborbicular to short-oblong, obtuse at base, narrowed abruptly into flattened glabrous petioles 1–4 cm. long, truncate to obtuse at apex, entire, shining and glabrous above, glabrous beneath, somewhat fleshy, veins quite conspicuous, about 8–12 principal ones on each side of midrib, submarginal vein weakly developed; leaf-blades 1.5–5 cm. long, 1.5–3.5 cm. wide, not much reduced up the stem; flowers solitary in the axils; pedicels 1–5 cm. long, glabrous; bracteoles at apex of pedicel, squamate, 0.5 mm. long, thickened; sepals 5 (sometimes 4), lance-ovate, 4–6 mm. long, acute, 3–5-nerved; petals white with basal yellow spot, oblong-obovate, 8–14 mm. long, 7–10 mm. wide, with short broad claw; disc flat, pilose; stamens unequal, filaments flattened at base, 4–5 and 3–3.5 mm. long; anthers 1–2 mm. long; style 4–7 mm. long, white, stigma green and capitate, somewhat lobed, 1.5 mm. wide; ovary linear, cylindrical, glabrous, 9–12 mm. long; capsule subcylindric, sometimes curved, 10- (8-) nerved, gradually narrowed at base, 2–3 cm. long, 2.5–3 mm. thick, fairly thick-walled, sometimes externally marked into transverse divisions by the contained seeds; seeds in 1 row in each locule, completely invested by and adnate to the shining hard angular pale brown endocarp which is 1.5 mm. long.

Usually in water. Southern Mexico to Peru and Paraguay.

CANAL ZONE: Gatun Lake, *Seibert 604, Cowell 310*; Barro Colorado Island, *Woodworth & Vestal 544, Aviles 24, Shattuck 410* & *1132, Bangham 510, Salvoza 936*; Ahorca Lagarto to Culebra, *Cowell 382*; Río Chagres, *Fairchild 2107* and *2042*; Madden Lake, *Woodson & Schery 959.*

15. JUSSIAEA URUGUAYENSIS Camb. in St. Hilaire, Fl. Bras. Merid. 2:264. 1829.

Ludwigia urugayensis Hara, Journ. Jap. Bot. 28:294. 1953.
Jussiaea grandiflora Michx., Fl. Bor. Am. 1:267. 1803, not *J. grandiflora* R. & P., 1802.
Jussiaea repens var. *grandiflora* Mich. in Martius, Fl. Bras. XIII, pt. 2:167. 1875.
Ludwigia clavellina var. *grandiflora* Gomez, Anal. Hist. Nat. Madrid 23:66. 1894.
Jussiaea stenophylla Gillies ex Hook., Bot. Misc. 3:312. 1833.
Jussiaea Stuckerti Lévl., Bull. Acad. Geogr. Bot. 17:210. 1907.
Jussiaea repens var. *hispida* Hauman-Merck, Anal. Mus. Nac. Buenos Aires 24:406. 1913.
Jussiaea grandiflora formae *natans, semimersa* and *terrestris* Glueck, Beihefte Bot. Centralbl. 39:355–356. 1923.
Jussiaea Michauxiana Fernald, Rhodora 46:197. 1944.

Perennial herb from creeping rhizome, rooting freely at nodes, sometimes also bearing pneumatophores, stems usually reddish and of three possible types: (1) slender, floating, scarcely branched, glabrous, 3–10 (–15) dm. long and with leaves remote, floating, oblong or obovate, glabrous, 1–4 cm. long, 1–1.5 cm. wide, obtuse, entire, narrowed gradually or abruptly into slender petioles 1–2 cm. long; (2) erect or ascending, succulent or even somewhat woody, usually soft-hirsute, somewhat angled, simple or freely branched, 3–6 dm. high, with leaves rather crowded, ascending, linear-lanceolate to oblanceolate or oblong, the lower spatulate to obovate, entire, mostly soft-hairy, usually gland-mucronate, narrowed gradually into winged petioles 1–5 (–25) mm. long, with ca. 10–12 principal fairly prominent veins on each side of midrib, the submarginal vein scarcely developed, leaf-blades 3–6 (–10) cm. long, 0.3–1 (–3) cm. wide, often with fascicles of reduced leaves in axils; stipules deltoid, gland-thickened; and (3) compact, much branched, creeping, rooting freely at nodes, thus forming mats on sand or mud, the stems 1–10 dm. long, pubescent; leaves spatulate to oblanceolate, 0.5–1.8 cm. long, usually pubescent, very short-petioled, with axillary fascicles; flowers solitary in axils on erect type of branch; pedicels 1–2 (–5) cm. long, spreading or reflexed in fruit, glabrous to hairy; bracteoles at base of ovary, lanceolate, 0.5–1 mm. long; ovary sublinear, 7–10 mm. long, hairy; sepals 5 (6), lanceolate, acute, hairy, 6–13 mm. long, indistinctly 3-nerved; petals bright yellow, oblong-ovate, 12–20 mm. long, emarginate, short-clawed; disc plane, pilose; stamens unequal; filaments 3–4 and 2–3 mm. long; anthers 2–3 mm. long; style slender, 4–5 mm. long; stigma capitate, 1.5–2 mm. thick; capsule subcylindric, 10-nerved, usually hairy, plainly marked externally by the contained seeds, abruptly narrowed at the base, but not at all at the apex, 1.3–2.5 cm. long, 3–4 mm. thick; seeds pendulous, enclosed in the hard endocarp and thus made to appear truncate at both ends, triangular in cross section, 1.5 mm. long, 1.5 mm. wide.

In water and moist places. Southeastern United States, Guatemala and Costa Rica, Ecuador, Peru, Brazil to Argentina.

To be expected in Panama.

16. JUSSIAEA REPENS L. var. PEPLOIDES (H.B.K.) Grisebach, Cat. Pl. Cubens., 107. 1866.

Jussiaea peploides H.B.K., Nov. Gen. et Sp. 6:97. 1823.
Ludwigia ascendens var. *peploides* Hara, Journ. Jap. Bot. 28:291. 1953.
Jussiaea polygonoides H.B.K., l.c.
Jussiaea patibilcensis H.B.K., l.c.
Jussiaea Swartziana DC., Prodr. 3:54. 1828.
Jussiaea ramulosa DC., l.c.
Ludwigia ramulosa Gomez, Anal. Hist. Nat. Madrid 23:66. 1894.
Jussiaea repens var. *ramulosa* Griseb., Cat. Pl. Cubens., 107. 1866.
Jussiaea polygonifolia Willd. ex Steud., Nomencl. ed. 2, 1:836. 1840.
Jussiaea fluitans G. Don, Gen. Syst. 2:692. 1832.
Jussiaea repens var. *minor* Mich. in Martius, Fl. Bras. XIII, pt. 2:166. 1875.
Jussiaea repens var. *californica* Wats., Bot. Calif. 1:217. 1876.
Jussiaea californica Jepson, Fl. West. Mid. Calif., 326. 1901.
Jussiaea Gomezii Goyena, Fl. Nicaraguense 1:406. 1909.

Perennial herb with creeping or floating stems, rooting freely at the nodes, often ascending at the tips, freely branched especially in terrestrial forms, essentially glabrous; roots mostly fibrous, sometimes spongy; leaves oblong to spatulate-oblong, obtuse to acute, 1–4 (–6) cm. long, 0.5–2 cm. wide, those above the water tending to be glandular-mucronate, narrowed at base into flattened or winged petioles 0.5–2.5 cm. long, entire, with ca. 7–11 principal veins on each side of the midrib, submarginal vein scarcely evident, leaf-blades usually shining above, somewhat ciliate, minutely pellucid-punctate; pedicels slender, ascending to reflexed in fruit, 1–3 cm. long; bracteoles deltoid, squamate, thickened, 0.5–1 mm. long; sepals 5, linear-lanceolate, subglabrous, 4–7 mm. long, obscurely nerved, acute; petals yellow, obovate, emarginate, 7–14 mm. long; disc flat, hairy; stamens somewhat unequal; filaments slender, 3–6 mm. long; anthers ca. 1 mm. long; style slender, 3–5 mm. long; stigma flattened, shallowly 5-lobed, 1–2.5 mm. wide; ovary subcylindric, 7–14 mm. long; fruit cylindrical, unequally 10-nerved, marked on the surface by the contained seeds, 1–2.5 cm. long, 2–2.5 mm. thick, scarcely if at all narrowed at apex, rather abruptly so at base; seeds in 1 row in each locule, pendulous, included in endocarp, oblique-truncate at ends, somewhat triangular in cross-section, 1–1.5 mm. long.

In water and on wet banks. Southwestern United States through Mexico to South America except Chile; West Indies.

To be expected in Panama.

2. LUDWIGIA L.

LUDWIGIA L., Gen. Pl., ed. 5, 55. 1754.

Isnardia L., Gen. Pl., ed. 5, 56. 1754.

Mostly perennial herbs with opposite or alternate leaves and solitary axillary flowers or, by reduction of upper leaves, terminal spikes or heads. Flowers normally 4-merous, the stamens as many as the sepals and with relatively short filaments. Petals often small or wanting; if conspicuous, usually early deciduous. Floral tube not prolonged beyond the ovary. Bracteoles lacking to quite well developed. Sepals persistent; summit of ovary truncate or flattish, or crowned with pyramidal to depressed persistent 4-lobed base of style (stylopodium); style short; stigma capitate to somewhat 4-lobed. Capsule subspheric to obpyramidal, elongate, angled or subterete, dehiscing by a terminal pore or longitudinally. Seeds many, naked with evident raphe and multiseriate in each cell, or rarely enclosed in endocarp and uniseriate. A genus of ca. 35 species of wet warm places in Old and New Worlds.

a. Petals lacking or minute; leaves petioled; floating or creeping plants....... 1. L. PALUSTRIS
aa. Petals conspicuous; leaves subsessile; plants decumbent or ascending. 2. L. VERTICILLATA

1. LUDWIGIA PALUSTRIS (L.) Elliott var. NANA Fernald & Griscom, Rhodora 37: 176. 1935.

Isnardia palustris β americana DC., Prodr. 3:61. 1828.
Ludwigia repens Forst., Cat. Pl. N. Am., 22. 1771.
Ludwigia apetala Walt., Fl. Car., 89. 1788.

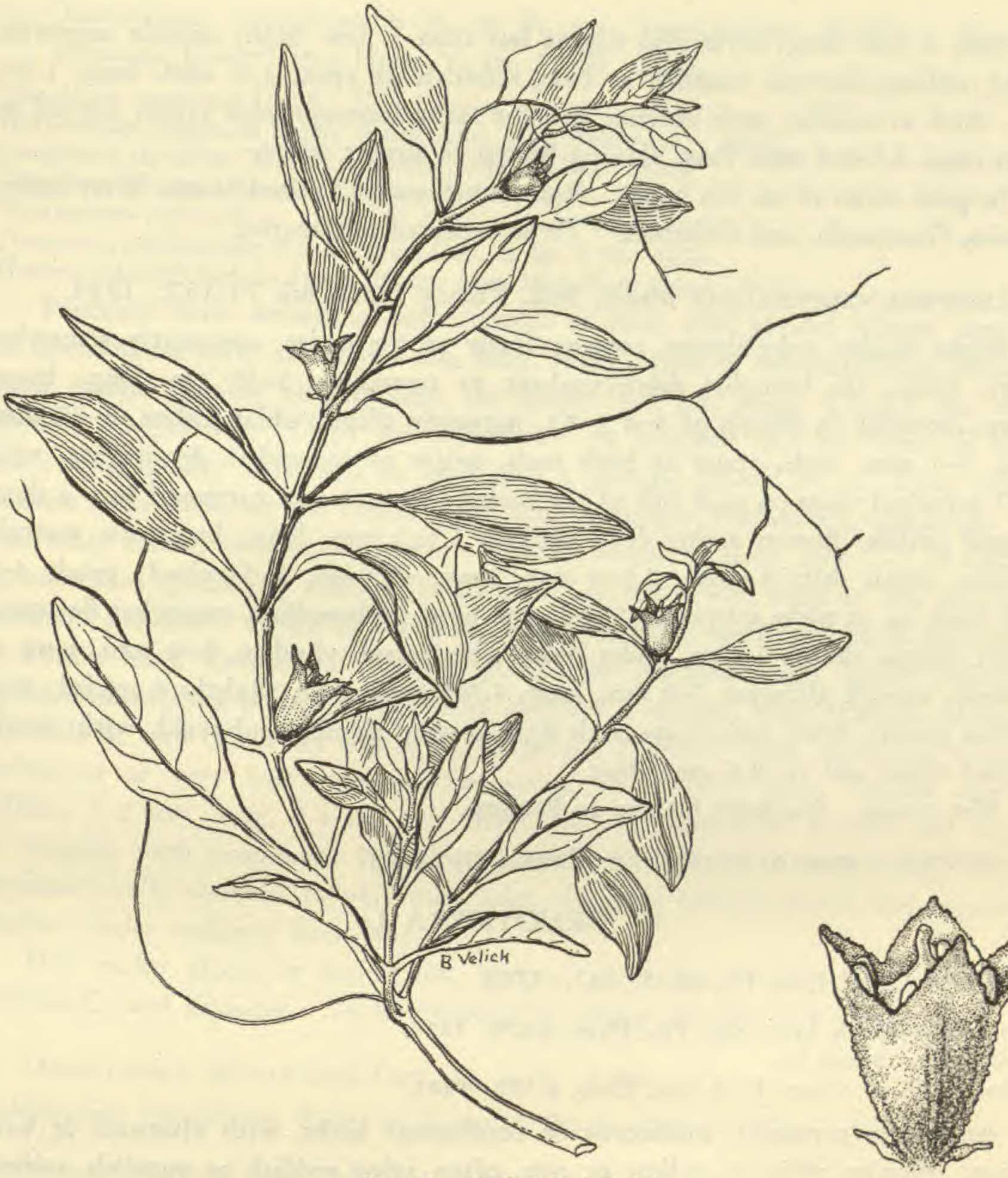

Fig. 95. *Ludwigia palustris*

Ludwigia nitida Michx., Fl. Bor. Am. 1:87. 1803.
Isnardia nitida Poir. in Lam., Encycl. Suppl. 3:188. 1813.
Isnardia ascendens Hall in Eaton, Man. N. Am. Bot., ed. 7, 353. 1836.
Ludwigia palustris var. *inundata* Svenson, Torreya 35:120. 1935.

Annual or perennial, glabrous or nearly so, sometimes minutely pubescent along leaf-margins, more or less succulent, the stems mostly floating, or procumbent, 1–5 (–7) dm. long, subsimple to diffusely branched, rooting freely at nodes, angled, green or with some reddish tinge; leaves opposite, the blades lanceolate to narrow-elliptic, or broadly elliptic-ovate, mostly 0.5–1.5 cm. long, entire, shining, with 4–5 principal veins on each side of midrib, acute to acuminate at apex, usually rather gradually narrowed at base into petioles 0.5–2 cm. long; flowers subsessile; ovary usually pale with 4 longitudinal green bands extending to the summit; bracteoles scarcely evident or up to ca. 1 mm. long, on base of ovary; sepals deltoid-ovate, acute, 0.5–1 mm. long; petals apparently none; stamens less than 1 mm. long; style plus stigma less than 1 mm. high; capsule somewhat corky, oblong-obovoid, rounded at base, truncate at apex, 2–3 mm. long, 1.4–2 mm. thick at middle; seeds oblong, straight along inconspicuous raphe, curved on other edge, 0.5–0.8 mm. long, shining brown to almost white.

In quiet water or on wet banks. From southeastern United States, West Indies, Mexico, Guatemala, and Colombia. To be expected in Panama.

2. LUDWIGIA VERTICELLATA Munz, Bull. Torrey Bot. Club 71:157. 1944.

Stems slender, subglabrous, rooting freely at the nodes, apparently somewhat fleshy, green, the branches subdecumbent to ascending, 3–15 cm. long; leaves many, crowded, in whorls of 3–4 (–6), narrowly elliptic-oblanceolate, 8–18 mm. long, 1–3 mm. wide, acute at both ends, entire to somewhat denticulate, with ca. 7 principal veins on each side of the midrib, lower leaves narrowed into a short winged petiole; flowers rather few; pedicels 1.5–3 mm. long; bracteoles scarcely evident; sepals deltoid-ovate, 2.5–4 mm. long, obtusish, 3–5-veined; petals 4–5 mm. long, ca. as wide; stamens 1.5–2.5 mm. long; stylopodium somewhat flattened, hairy; stigma almost 1 mm. wide; ovary clavate-subcylindric, 5–6 mm. long at anthesis; capsule glabrous, 7–8 mm. long, 1.5–2 mm. wide, slightly 4-angled, with median groove down each face; seeds light brown, shining, subovoid. with clearly defined raphe and ca. 0.6 mm. long.

Wet places. Southern Mexico to Panama.

PANAMÁ: Laguna de Portola, near Chepo, *Pittier 4605*.

3. OENOTHERA L.

OENOTHERA L., Gen. Pl., ed. 5, 163. 1754.

Hartmannia Spach, Hist. Nat. Vég. Phan. 4:370. 1835.
Xylopleurum Spach, l.c.
Raimannia Rose, Contr. U. S. Nat. Herb. 8:330. 1905.

Annual to perennial, caulescent or acaulescent herbs, with alternate or basal leaves. Flowers white to yellow or rose, often aging reddish or purplish, solitary in axils or in racemes or spikes. Floral tube prolonged beyond the ovary, quite deciduous. Sepals 4, reflexed in anthesis. Petals 4. Stamens 8, equal, or if unequal the epipetalous shorter; anthers mostly versatile. Stigma varying from having 4 linear lobes, to discoid or capitate. Capsule membranous to woody, straight to curved or coiled, 4-loculed, 4-valved, mostly dehiscent. Seeds many, naked. A genus of ca. 200 species mostly of temperate parts of the Americas.

a. Capsule broadest above the middle, clavate, 4-angled or -winged; seeds appearing smooth under hand-lens. (Subgenus *Hartmannia*).
b. Petals 2–3.5 cm. long, white, aging pink; body of capsule 1–1.5 cm. long, with wings 2–3 mm. wide........ 2. OE. TETRAPTERA
bb. Petals 0.3–1 cm. long, not white; body of capsule mostly shorter, with narrower wings.
c. Flowers yellow or greenish, aging orange-red, the petals 3–6 mm. long; leaves subentire........ 1. OE. MULTICAULIS
cc. Flowers rose to red-violet, aging purplish, the petals 5–10 mm. long; leaves mostly sinuate-pinnatifid to -dentate........ 3. OE. ROSEA
aa. Capsule cylindrical, subterete; petals yellow, 5–15 mm. long; seeds evenly and regularly pitted. (Subgenus *Raimannia*)........ 4. OE. LACINIATA

1. **OENOTHERA MULTICAULIS** R. & P. var. **TARQUENSIS** (H.B.K.) Munz & Johnston, Contr. Gray Herb., n. ser. 75:18. 1925.

Oenothera tarquensis H.B.K., Nov. Gen. et Sp. 6:91. 1823.
Hartmannia tarquensis Spach, Nouv. Ann. Mus. Paris 4:363. 1835.
Oenothera ascendens Willd., in Spreng., Syst. 2:230. 1825.
Oenothera cuprea Schlecht., Linnaea 12:269. 1838.
Hartmannia cuprea Rose, Contr. U. S. Nat. Herb. 8:328. 1905.
Oenothera epilobiifolia H.B.K., Nov. Gen. et. Sp. 6:92. 1823.
Hartmannia epilobiifolia Spach, Nouv. Ann. Mus. Paris 4:364. 1835.

Perennial herb, sometimes suffrutescent at base, with several villous, prostrate or procumbent leafy stems 1–3 dm. long, these simple or few-branched; leaves of basal rosette broadly oblanceolate, the blades 1–5 cm. long, 0.5–2.5 cm. wide, obtuse, subglabrous, except for pubescence on margins and on veins of lower surface, gradually narrowed at base into a winged petiole of ca. same length; cauline leaves more or less villous, especially the upper, herbaceous, commonly 2–3 cm. long, usually denticulate; flowers solitary, sessile, axillary, only 1–2 in anthesis at one time, apparently diurnal; floral tube 4–8 mm. long, more or less pubescent without, pubescent within at very base, often purplish; sepals lanceolate, pubescent, 3–6 mm. long, distinct in anthesis, green with purplish tinge; petals yellow or greenish, becoming orange-red, broadly obovate, 3–6 mm. long; stamens subequal, one-half or two-thirds the length of the petals, glabrous; style exceeding stamens, pubescent at very base; stigma-lobes ovoid, ca. 1 mm. long; capsule clavate, villous, 1–2 cm. long, 0.4–0.5 cm. thick, arcuate, somewhat 4-sided and angled or winged, with prominent vein down middle of each face; seeds many, brown, asymmetrically obovoid, 0.5–0.9 mm. long, minutely cellular-pitted, but appearing smooth under ordinary hand-lens.

Dry rocky places in mountains, Mexico, Guatemala, Costa Rica, Colombia, Venezuela, and Ecuador. To be expected in higher mountains of Panama.

2. **OENOTHERA TETRAPTERA** Cav., Ic. 3:40. 1794.

Xylopleurum tetrapterum Raim. in Engler & Prantl, Die nat. Pflanzenfam. III, 7:214. 1893.
Hartmannia tetraptera Small, Bull. Torrey Bot. Club 23:181. 1896.
Oenothera tetraptera var. *immutabilis* Lévl., Mon. Onoth., 122. 1902.
Hartmannia macrantha Spach, Nouv. Ann. Mus. Paris 4:363. 1835.
Oenothera latiflora Sér. in DC., Prodr. 3:50. 1828.
Hartmannia latiflora Rose, Contr. U. S. Nat. Herb. 8:329. 1905.

Perennial herb, sometimes suffrutescent, decumbent to ascending, with few simple or branched stems 1.5–5 dm. long, more or less strigulose and also with long spreading hairs; basal leaves oblanceolate or broader, 3–10 cm. long, 1–3 cm. wide, sinuate-pinnatifid, with several ovate-oblong lateral lobes and a larger terminal one, subglabrous to villous, with well developed petioles; cauline leaves reduced, 2–5 cm. long, mostly sinuate-pinnatifid; flowers vespertine, in axils of uppermost reduced leaves; floral tube commonly hirsute as well as strigose, ca. 1 cm. long, puberulent within at base; sepals commonly reddish, 2–3.5 cm. long, coherent in anthesis, at least in pairs, with minute free tips in bud; petals white, rose in age, 2–3.5 cm. long, broadly obovate; stamens subequal, one-half to two-thirds the length of the petals; filaments 1–1.5 cm. long; capsule proper obovoid, 1–1.5 cm. long, 0.6–0.8 cm. thick, hirsute, especially on veins and wings, the latter 2–3 mm. wide, capsule narrowed into a basal ribbed hollow sterile part 0.5–2.5 cm. long; seed light brown, obovoid, ca. 1.3 mm. long.

Ranging from Mexico to Costa Rica and in Colombia and Venezuela. To be expected in Panama in the mountains.

3. OENOTHERA ROSEA Ait., Hort. Kew., ed. 1, 2:3. 1789.

Hartmannia rosea G. Don in Sweet, Hort. Brit., ed. 3, 236. 1839.
Xylopleurum roseum Raim. in Engler & Prantl, Die nat. Pflanzenfam. III, 7:214. 1893.
Oenothera rubra Cav., Icones 4:68, *t. 400*. 1797.
Oenothera purpurea Lam., Encycl. 4:554. 1797.
Oenothera virgata R. & P., Fl. Peruv. 3:79, *t. 315*. 1802.
Hartmannia virgata Spach, Nouv. Ann. Mus. Paris 4:363. 1835.
Hartmannia gauroides Spach, l.c.
Hartmannia affinis Spach, Ann. Sci. Nat., ser. 2, 4:167. 1835.
Oenothera psycrophila Ball, Journ. Linn. Soc. 22:38. 1885.
Oenothera rosea var. *parvifolia* Coult., Contr. U. S. Nat. Herb. 2:116. 1891.
Hartmannia rosea var. *parvifolia* Small, Bull. Torrey Bot. Club 23:181. 1896.
Godetia Heucki Phil., Anal. Univ. Chil. 84:743. 1893.
Gaura epilobia Moç. & Sessé ex Sér. in DC., Prodr. 3:45. 1828.

Perennial, flowering the first year, with several erect or ascending, slender, simple or branched stems from a somewhat woody caudex and 1–5 dm. long, or shrubby and becoming 10 dm. tall, more or less strigulose throughout, sometimes with spreading hair on the lower stems; leaves usually not crowded, the basal oblanceolate to narrowly obovate, subentire to coarsely sinuate-dentate or -pinnatifid, 2–5 cm. long, obtuse, narrowed into slender petioles 1–2 cm. long; cauline leaves gradually reduced up the stem, mostly oblong-ovate, 1.5–3 cm. long; uppermost reduced to bracts in axils of which are borne the flowers in slender racemes; floral tube 4–8 mm. long, slender, strigulose-canescent without, somewhat puberulent within; sepals 5–8 mm. long, with free tips ca. 1 mm. long, and commonly coherent in anthesis; petals rose to red-violet, broadly obovate, 5–10 mm. long; stamens subequal, almost as long as petals; filaments slender 4–6 mm. long; anthers 2.5–4 mm. long; capsule proper obovoid, 8–10 mm. long, 3–4 mm. thick, the 4 angles somewhat winged, scarcely 1 mm. wide, the midrib of each valve strongly developed, base of capsule passing into a hollow and ribbed part 5–20 mm. long; seeds oblong-obovoid, asymmetrical, brown, ca. 0.6 mm. long.

Common in damp places from southern United States to Peru and Bolivia. To be expected in Panama.

4. OENOTHERA LACINIATA Hill var. PUBESCENS (Willd.) Munz, Am. Journ. Bot. 22:656. 1935.

Oenothera pubescens Willd. ex Spreng., Syst. 2:229. 1825.
Oenothera Steubelii Hieron., Engler Bot. Jahrb. 21:327. 1895.
Oenothera nyctaginifolia Small, Bull. Torrey Bot. Club 27:278. 1900.
Raimannia confusa Rose, Contr. U. S. Nat. Herb. 8:330. 1905.
Raimannia colimae Rose, l.c.
Anogra amplexicaulis Woot. & Standl., Contr. U. S. Nat Herb. 16:150. 1905.

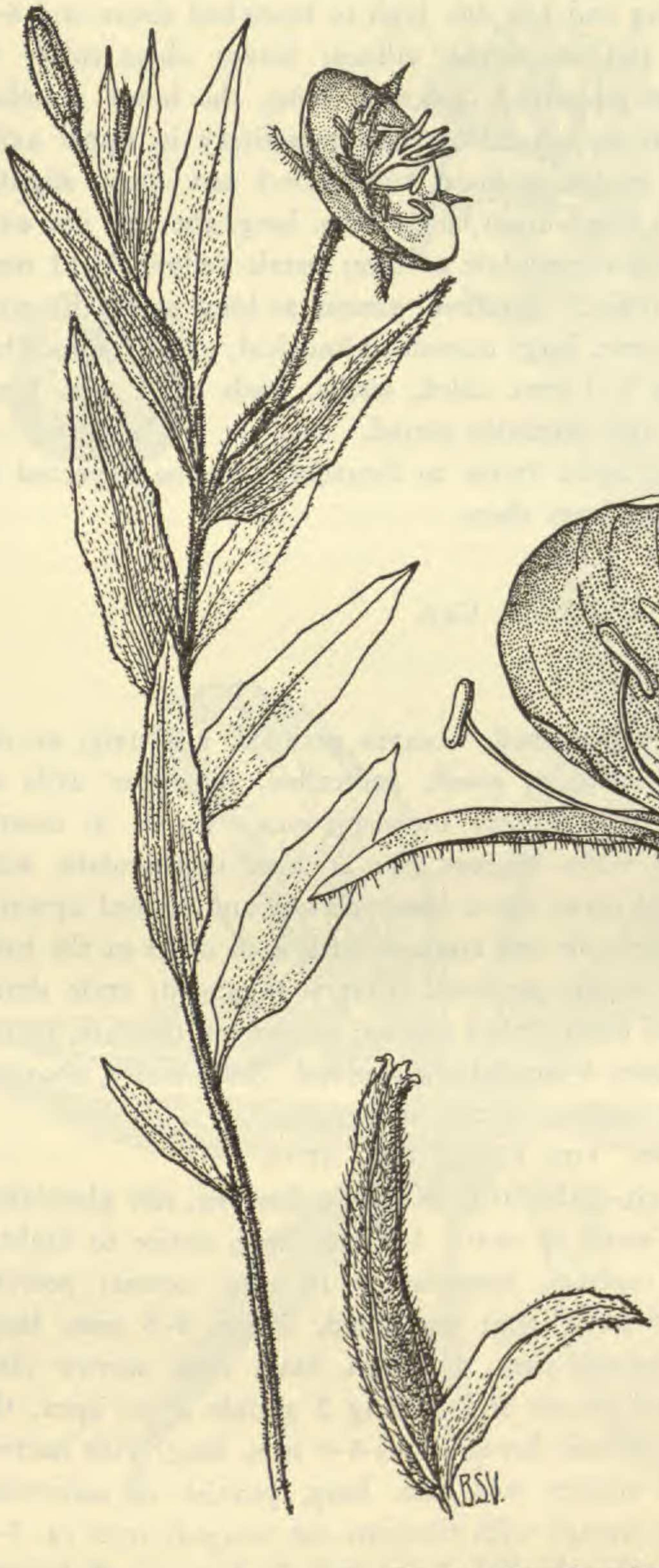

Fig. 96 *Oenothera laciniata*

Perennial, from simple and erect and 1–2 dm. high to branched above and 6–8 dm. high, cinereous-puberulent and somewhat villous; leaves oblanceolate to oblong-lanceolate, mostly sinnuate-pinnatifid, 2–8 cm. long, the lower petioled, the upper gradually reduced, more or less sessile; flowers solitary in upper axils, the stem tip and buds erect or nodding; floral tube 1.5–3 cm. long, slightly pubescent within near base; sepals lance-linear, 6–10 mm. long, the tips not over 0.5 mm. long and scarcely if at all corniculate or free; petals yellow, 5–15 mm. long, broadly obovate; filaments slightly flattened, almost as long as petals; style glabrous; stigma lobes linear, 2–6 mm. long; capsule cylindrical, usually somewhat arcuate, divaricate, 1–3 cm. long, 2–3 mm. thick, sessile; seeds ca. 1 mm. long, 0.6 mm. thick, brownish, evenly and regularly pitted.

Damp places. Southwestern United States to Ecuador. To be expected in Panama, although no material seen from there.

4. LOPEZIA Cav.

LOPEZIA Cav., Ic. 1:12, *t. 18*. 1791.

Herbs or shrubs, mostly freely branched. Leaves petioled, alternate, or the lower opposite, simple. Flowers solitary, small, pedicelled, in upper axils of sometimes much reduced leaves. Floral tube inconspicuous. Sepals 4, mostly red, narrow. Petals 4, dissimilar, white to rose, the 2 upper unguiculate, with none, one, or two glands at apex of claw; the 2 lower clawed and curved upward, glandless. Stamens 2, adnate to the style and connate with each other at the base, the posterior fertile, the anterior sterile, petaloid. Ovary 4-loculed; style short, filiform, with slightly enlarged and barely lobed stigma; ovules multiseriate, many. Capsule globose to clavate, coriaceous, 4-loculed and -valved. Seeds many, obovoid, granulate. A genus of about 14 species; Mexico to Panama.

1. LOPEZIA PANICULATA Seem. Bot. Voy. Herald 120. 1853.

Branched shrub to ca. 1 m. high, glabrous to hirsute-pubescent, not glandular; leaves alternate or opposite, lance-ovate to ovate, 1–5 cm. long, entire to slightly dentate; flowers in quite dense racemes, irregular, 7–10 mm. across; pedicels slender, spreading, glabrous, 7–18 mm. long; sepals red, linear, 4–5 mm. long, 1–1.5 mm. broad; upper petals mostly pink, 4–5 mm. long, with narrow claw comprising ca. two-thirds the total length and bearing 2 glands at its apex, the blades spatulate, winged above the glands; lower petals 4–5 mm. long, with narrow claw and roundish blade; sterile stamen 4–5 mm. long, pinkish or somewhat purple, with obovate blade; fertile stamen with filament not winged; style ca. 3–4 mm. long; stigma flat, round; capsule spherical, 2.5–3 mm. in diam.; seeds brown, covered with corky tubercles and ca. 1 mm. long.

Rather dry places at 3000 to 5000 ft., Guatemala to Panama.

CHIRIQUÍ: near El Volcán, Río Chiriquí Viejo Valley, *Gene White 30*; upper Río Chiriquí Viejo, *Gene White 43, Peggy White 323*; Llanos del Volcán, *Allen 987* and *1553*; Bajo Mono, Boquete District, *M. E. Davidson 493*; El Boquete, *Killip 3505, Pittier 2890, Bro. Maurice 749*.

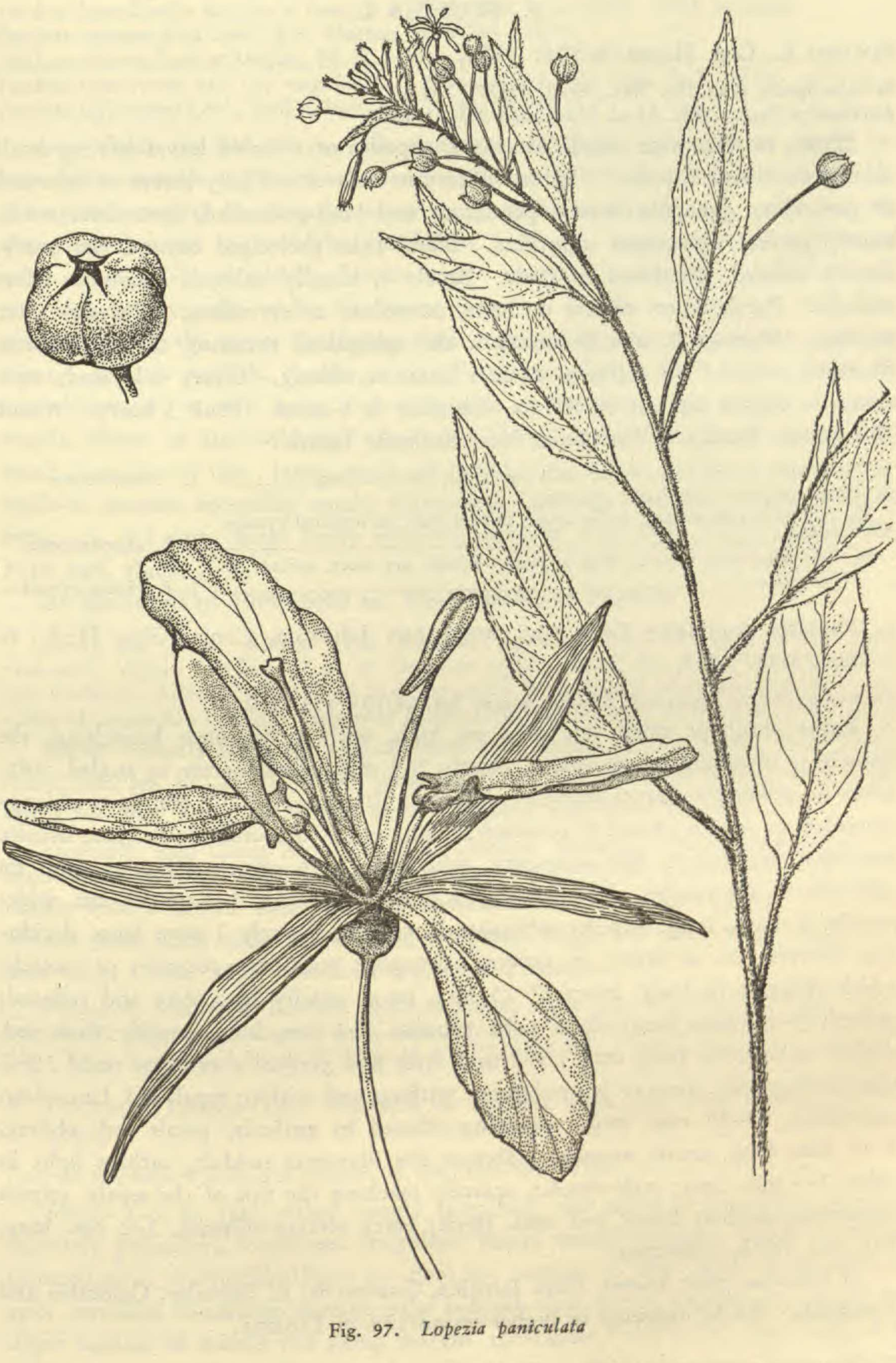

Fig. 97. *Lopezia paniculata*

5. FUCHSIA L.

Fuchsia L., Gen. Pl., ed. 5, 126. 1754.

Schufia Spach, Ann. Sci. Nat., ser. 2, 4:177. 1835.
Encliandra Zucc., Abh. Akad. Muenchen 2:335. 1837.

Shrubs to trees with simple, alternate, opposite or whorled leaves having small usually deciduous stipules. Flowers solitary in axils of ordinary leaves or racemose or paniculate, generally showy, pendulous and long-pedicelled, sometimes erect; mostly perfect, sometimes imperfect. Floral tube prolonged beyond the ovary, usually colored, deciduous in fruit. Sepals 4, usually colored, deciduous after anthesis. Petals 4, or minute or none, convolute or spreading, deciduous after anthesis. Stamens 8, usually unequal, the episepalous exceding the epipetalous; filaments more or less filiform; anthers linear to oblong. Ovary 4-loculed; style elongate; stigma capitate or clavate, subentire to 4-lobed. Fruit a berry. About 100 species, Mexico to Patagonia; New Zealand, Tahiti.

a. Floral tube several times longer than the sepals, 5–6 cm. long.................. 1. F. BOLIVIANA
aa. Floral tube not more than 1 cm. long.
  b. The floral tube as long as the sepals; flowers erect, in terminal cymose panicles.................. 2. F. ARBORESCENS
  bb. The floral tube twice as long as sepals; flowers not erect, solitary in leaf-axils.................. 3. F. HEMSLEYANA

1. **Fuchsia boliviana** Carr. var. **luxurians** Johnston, Contr. Gray Herb., n. ser. 75:38. 1925.

Fuchsia cuspidata Fawcett & Rendle, Journ. Bot. 64:105, 159. 1926.

Bushy shrub or small tree to 6 m. high, with rather open branching, the branchlets spreading or pendulous, mostly 2–4 mm. thick, terete to angled, soft-pilose to -pubescent; leaves opposite, sometimes alternate or in 3's, elliptic to oblong-lanceolate or -ovate, obtuse to rounded at base, acute to acuminate at apex, usually somewhat denticulate, soft-pubescent, with ca. 12–14 principal lateral veins on each side of the midrib, the blades 5–15 (–20) cm. long, 3–6 (–10) cm. wide; petioles 2–4 cm. long; stipules sublunate-lanceolate, scarcely 1 mm. long, deciduous; flowers few to many, in terminal drooping pubescent corymbs or panicles which elongate in fruit; bracts 7–25 mm. long, usually lanceolate and reflexed; pedicels 5–15 mm. long; floral tube tubular, 5–6 cm. long, usually dark red, slightly enlarged at base, then 1.5–2 mm. wide and gradually ampliate until 3.5–7 mm. wide at apex, more or less pubescent without and within; sepals red, lanceolate, acuminate, 17–20 mm. long, spreading-reflexed in anthesis; petals red, oblong, 9–13 mm. long, acute; stamens glabrous, the filaments reddish, anthers light in color, 2–3 mm. long; style slender, scarcely reaching the tips of the sepals; stigma subglobose, slightly lobed, 1–2 mm. thick; berry oblong-ellipsoid, 1–2 cm. long, 4–6 mm. thick, pubescent.

A montane plant known from Jamaica, Guatemala, El Salvador, Colombia and Venezuela. To be expected in higher mountains in Panama.

2. **Fuchsia arborescens** Sims, Curtis Bot. Mag., *t. 2620.* 1826.

Schufia arborescens Spach, Ann. Sci. Nat., ser. 2, 4:177. 1835.

Fuchsia hamellioides Moçiño & Sessé ex G. Don, Gen. Syst. 2:677. 1832, in synon.
Fuchsia syringaeflora Carr., Rev. Hortic., 1873:311. 1873.
Fuchsia arborea Sessé & Moçiño, Pl. N. Hispan., ed. 1, 58. 1887–1890.
Fuchsia arborescens var. (?) *megalantha* J. Donn. Smith, Bot. Gaz. 18:2. 1893.
Fuchsia Liebmanni Lévl., Bull. Géogr. Bot. 22:24. 1912.

Low shrub to tree 20 m. tall, sometimes epiphytic, glabrous or nearly so; branchlets, petioles and veins sometimes tinged with red; leaves opposite or in 3's, oblong-oblanceolate to -elliptic, acute or acuminate at both ends, paler beneath than above, entire to serrulate, the blades 3–20 cm. long, with 9–13 principal veins on each side of midrib; flowers many, crowded in corymbose panicles 5–25 cm. long and equally wide, the lower branches of the inflorescence with few reduced leaves, the upper floriferous ones with much reduced deciduous subulate bracts; pedicels reddish, slender, erect, 5–20 mm. long; floral tube tubular to funnelform, 4.5–8 mm. long, 2–3 mm. wide at summit; sepals reddish to wine-purple, linear to lance-oblong, 4.5–7 mm. long, spreading-reflexed at anthesis; petals lavender to lilac, lance-ovate, spreading, two-thirds as long as sepals; episepalous stamens exceeding sepals, epipetalous somewhat shorter; stigma purplish, conic, ca. 0.5 mm. long; berry purplish, covered with blue bloom, subglobose, 7–10 mm. thick.

At elevations of 1000–2600 m., from Mexico to Panama.

BOCAS DEL TORO: Robalo Trail, northern slopes of Cerro Horqueta, *Allen 4965*. CHIRIQUÍ: Volcán de Chiriquí, *M. E. Davidson 955A*; near Casita Alta, Volcán de Chiriquí *Woodson, Allen & Seibert 840* and *797;* near Bajo Chorro, *Woodson & Schery 700;* valley of upper Río Chiriquí Viejo near Monte Lirio, *Seibert 246*; El Boquete, *Pittier 2974*.

Minor variants from the typical form are: forma TENUIS Munz, Proc. Calif. Acad. Sci., ser. IV, 25:86. 1943, with the floral tube 5–6 mm. long, 1 mm. wide; sepals 5–6 mm. long, 1–1.5 mm. wide. Material seen from Panama:

CHIRIQUÍ: near Casita Alta, Volcán de Chiriquí, *Woodson, Allen & Seibert 911*; El Boquete, *Maxon 5015*; Bajo Mono, Robalo Trail, *Allen 4778*; near Cerro Punta, *Allen 3505*.

Forma PARVA Munz. l. c. [*Fuchsia paniculata* Lindl., Gard. Chron. 1856:301. 1856.] with floral tube funnelform, 3–4 mm. long, 1.5 mm. wide; sepals 3–4 mm. long, 1 mm. wide. Material seen from Panama:

CHIRIQUÍ: trail from Bambito to Cerro Punta, *Allen 310*; Río Chiriquí Viejo Valley between El Volcán and Cerro Punto, *Gene White 4*; near El Volcán, *Peggy White 179*; near "New Switzerland," central valley of Río Chiriquí Viejo, *Allen 1351*.

3. FUCHSIA HEMSLEYANA Woodson & Seibert, Ann. Mo. Bot. Gard. 24:194. 1937.

Fuchsia pulchella Woodson & Seibert, op. cit., 195–196. 1937.

Shrub 1–3 m. tall, rather openly branched, the ultimate branchlets slender, minutely pubescent, sometimes strigulose; leaves mostly opposite, rather crowded, subcoriaceous, rhomboid-elliptic to -obovate, cuneate at base, acute to obtusish at apex, serrulate to sinuate-dentate, paler beneath than above, subglabrous except on upper surface of midrib and along margin, the blades 7–15 (–25) mm. long, 4–8 (–12) mm. wide; petioles sparsely puberulent, 3–8 (–12) mm. long; flowers solitary, axillary, perfect or pistillate; pedicels filiform, 4–8 mm. long; floral tube

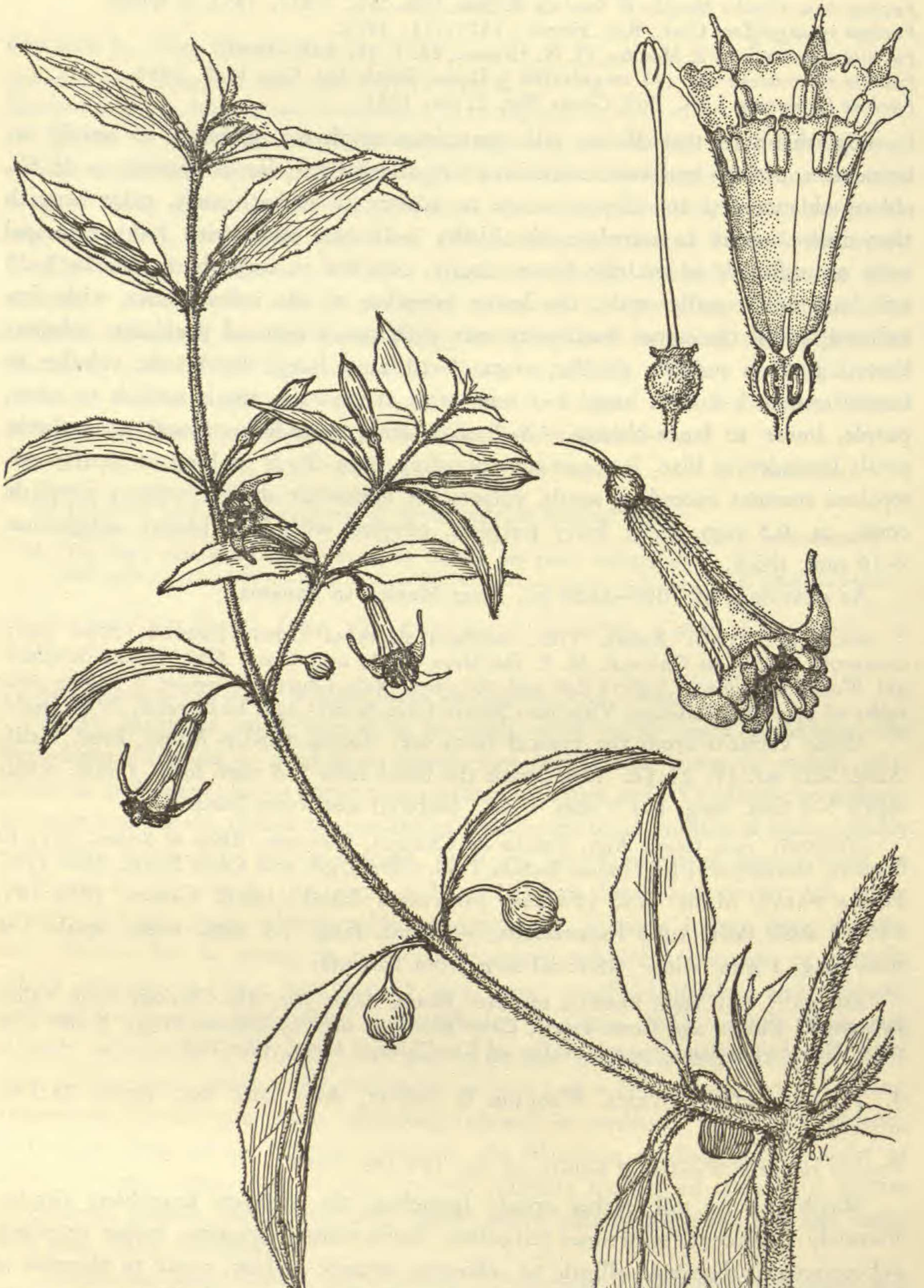

Fig. 98. *Fuchsia hemsleyana*

rose, tubular, constricted above ovary, 5–8 mm. long, 1–2 mm. wide at summit, glabrous to puberulent; sepals deltoid-lanceolate, rose, spreading-reflexed at anthesis, 3.5–4 mm. long, apiculate; petals rose or with purplish tinge, oblong-obovate, 2.5–4 mm. long, rounded at apex; stamens usually included; style 8–10 mm. long; stigma deeply 4-lobed, exserted, 1 mm. long; fruit subglobose, black-purple 4–5 mm. thick.

At about 1300–3500 m., mountains of Costa Rica and Panama.

CHIRIQUÍ: near Casita Alta, Volcán de Chiriquí, *Woodson, Allen & Seibert 811* and *873*; Cuca Peak, Volcán de Chiriquí, *Terry 1331*; Cerro Copete, *Allen 4897*; Finca Lerida, *Woodson & Schery 217*; Bajo Chorro, Boquete district, *M. E. Davidson 319, Woodson & Schery 637*; between El Volcán and Cerro Punta, *Gene White 2*; trail from Paso Ancho to Monte Lirio, *Allen 1497;* near Monte Lirio, upper Río Chiriquí Viejo, *Seibert 162, 182;* Cerro Pando, upper Río Chiriquí Viejo, *Peggy White 1*; Potrero Muleto to summit, Volcán de Chiriquí, *Woodson & Schery 417, 387, Davidson 876*; Cuesta de Cerro Quemado, east slope of Volcán Chiriquí, *Pittier 3114*.

HALORAGIDACEAE

1. GUNNERA L.

GUNNERA L. Mant. 1:16. 1767.

Perpensum Burm. f. Fl. Cap. Prodr. 30 (err. typ. 26). 1768.
Panke Molina, Sagg. Chile 143. 1782.
Dysemone Soland. ex Forst. f. in Comment. Goetting. 9:45. 1789.
Misandra Comm. ex Juss. Gen. 305. 1789.
Milligania Hook. f. in Hook. Icon. *t. 299.* 1840.
Misandropsis Oerst. in Kjoebenhavn Vid. Meddel. 192. 1857.
Pankea Oerst. loc. cit. 1857, var. typ.
Gunneropsis Oerst. loc. cit. 193. 1857.
Pseudo-Gunnera Oerst. loc. cit. 1857.

Perennial scapose herbs, our species very massive, with condensed succulent suberect or rhizomatous stems. Leaves proportionally large, long-petiolate, the blade palmately veined, broadly subreniform-cordate to suborbicular, variously lobed and incised, the petiole subtended by more or less conspicuous intra-axillary or ochreate stipules. Inflorescence scapose, paniculate, racemose or capituliform, bearing numerous minute sessile, ebracteate, hermaphrodite or unisexual epigynous flowers. Calyx lobes 2, minute, persistent but seldom accrescent. Petals 2 or 0, minute when present, deciduous. Stamens 2 or rarely 1, the anther basifixed, 2-celled, longitudinally dehiscent. Ovary inferior, 1-celled, containing a single pendulous ovule; stigma lobes 2 or rarely 1, sessile, filamentous, densely papillose. Fruit a minute 1-seeded drupe.

About 25 species chiefly of the high mountains of the western American cordillera from Chiapas to Tierra del Fuego, but with 9 described species in New Zealand and Tasmania and scattering species in eastern Brazil (Rio de Janeiro), Indonesia, Philippines, Hawaii, South Africa, Madagascar, and the high mountains of East Africa: a most puzzling and interesting distribution.

Because of the huge size of most species, *Gunnera* is a poor representative for Haloragidaceae, the other genera of which are rather small aquatic or subaquatic

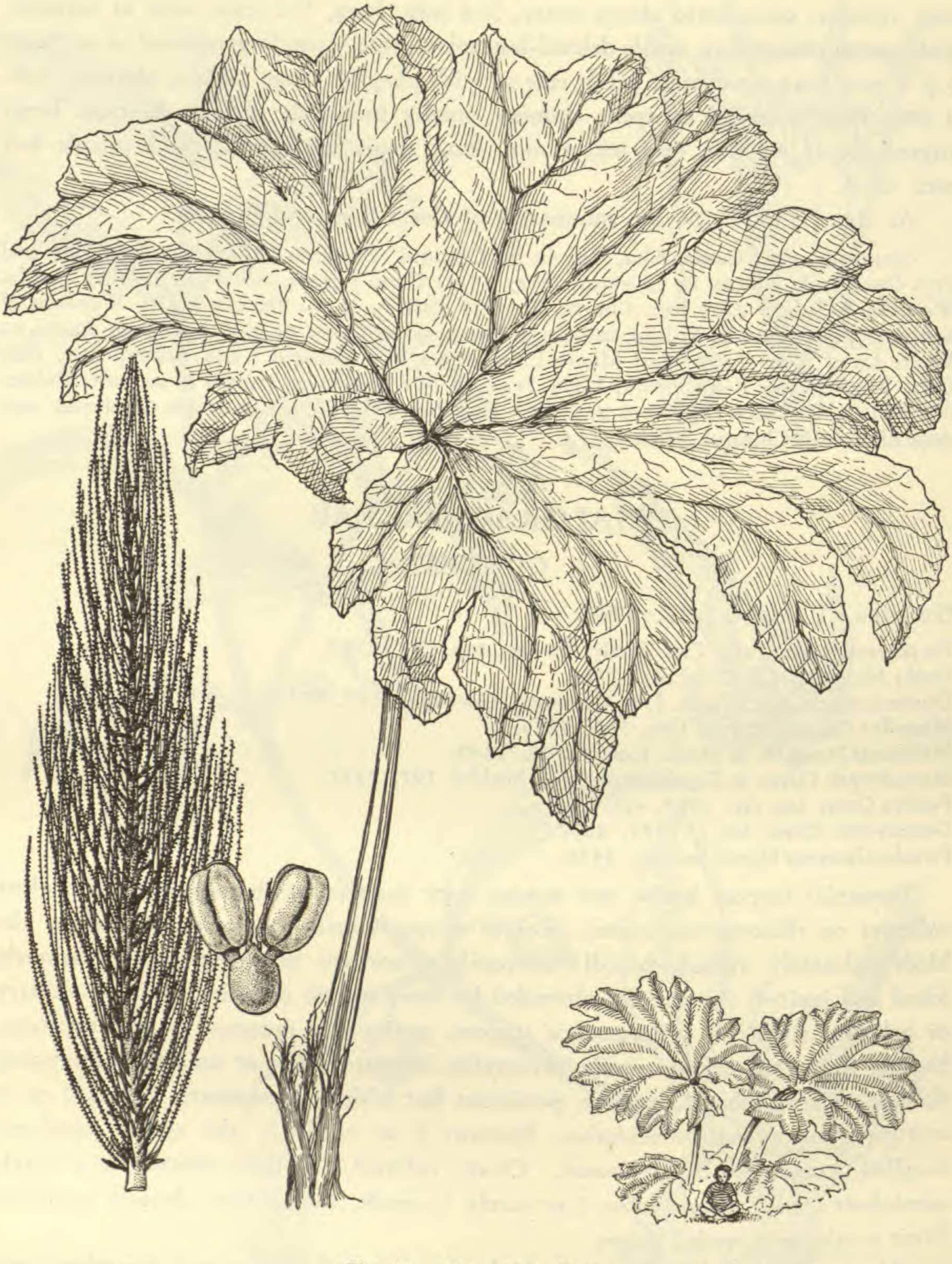

Fig. 99. *Gunnera insignis*

herbs such as the Parrot Feather (*Myriophyllum brasiliense* Camb.), a common aquarium plant in the north. The watery stems and petioles of *G. insignis* are inhabited by colonies of an endophytic alga, *Nostoc gunnerae*, which are seen easily if the plants are gashed with a machete.

1. GUNNERA INSIGNIS (Oerst.) A. DC. in DC. Prodr. 16^2:597. 1868.

Pankea insignis Oerst. in Kjoebenhavn Vidensk. Meddel. 189. 1857.
Gunneria wendlandii Reinke (in Morphol. Abh. 111. 1873, nom. nud.), ex Schindl. in Engl. Pflanzenreich IV^{225}:127. 1905.

Gigantic subacaulescent terrestrial herbs, the stem very succulent and up to about 3 dm. long and 1 dm. in diameter. Leaves very large, the elongate petioles subtended by numerous bright red, deeply laciniate, obovate-cuneate stipules up to 12 cm. long and 5 cm. broad; blade broadly subreniform-ovate to suborbicular, deeply cordate, with 7–9 very broad obscurely dichotomous, crenulate-serrate lobes, the veins ending in conspicuous marginal hydathodes, up to about 2 m. long and broad, minutely scabrous and somewhat bullate above, densely and minutely ferruginous-puberulent particularly on the venation beneath; petiole very stout, 1.5–2.0 m. long, up to 8 cm. broad at the base, minutely ferruginous-puberulent and more or less conspicuously muricate. Inflorescence spicate-paniculate, once-compound, the rachis axillary, up to about 1 m. long, minutely ferruginous-puberulent; flowering branches 1–3 dm. long, bearing very numerous small sessile ebracteolate flowers. Flowers apparently all hermaphrodite, apetalous, proterandrous; ovary broadly ellipsoid, about 1 mm. long, glabrous, the 2 broadly triangular calyx-lobes about one-quarter as long; anthers broadly oval, somewhat more than 1 mm. long, much longer than the filament; stigma lobes about as long as the ovary. Drupes broadly ovoid, about 1.5 mm. long, white.

Costa Rica and Panama, at high elevations (1,000–2,500 m.).

BOCAS DEL TORO: Robalo Trail, northern slopes of Cerro Horqueta, *Allen 5004*. CHIRIQUÍ: Bajo Mona, western slopes of Cerro Horqueta, *Allen 4799*; trail from Paso Ancho to Monte Lirio, upper valley of Río Chiriquí Viejo. *Allen 1501*; near El Volcán, *P. White 185*.

This magnificent species is one of the unforgettable sights seen by an observant climber in the high mountains of Chiriquí and central Costa Rica. The plants frequent the steep sides of moist ravines and quebradas where the giant leaves may be expanded to the sunlight.

ARALIACEAE

BY LORIN I. NEVLING JR.

In Panama, perennial herbs, shrubs or trees, sometimes scandent epiphytes when juvenile, rarely epiphytic at maturity. Leaves alternate, simple to pinnately or palmately compound or decompound; stipules adnate to the petiole, sometimes hardly distinct, sometimes connate and produced into a coriaceous ligulate sheath, sometimes absent. Flowers in umbels or heads, these disposed in solitary or compound inflorescences; pedicels continuous with or articulated with the calyx, sometimes swollen at the apex into minute cupules. Flowers epigynous, bisexual, polygamous or dioecious, actinomorphic, usually small; calyx tube obconic, cupuliform, or short-cylindric; petals 5–10, broadest at the base, deciduous at maturity, free or connate and calyptrate, valvate or narrowly imbricate; stamens usually as many as the petals and alternate with them (rarely more numerous), inserted on a disc within the calyx-limb, the filaments filiform or ligulate, the anthers oblong, ovate or subglobose, dorsally affixed, the locules 2, longitudinally dehiscent; disc epigynous, carnose and short-conic or annular; pistil 1, the ovary inferior, in our species 2- to 12-locular, the styles as many as the locules, sometimes distinct and at length recurved with the stigmas terminal or on the interior surfaces, sometimes completely connate into a carnose column, rarely suppressed with the stigmas sessile on the disc, the ovules solitary, pendulous from the apex of each locule, anatropous with a ventral raphe; fruit baccate or drupaceous, the exocarp usually carnose, the endocarp divided into distinct crustaceous, cartilaginous or membranous pyrenes, or hardly distinct from the exocarp; seeds solitary in pyrenes, laterally compressed, triquetrous in cross section, with copious endosperm and a small embryo near the hilum.

A family of about 65 genera with more than 800 species.

This treatment is based on a study of the North American Araliaceae by Albert C. Smith whose very capable and helpful work was published in North American Flora 28B:3–41. 1944.

The Araliaceae are represented in Panama by five indigenous genera and a single introduced ornamental species of a sixth. The introduction, *Nothopanax guilyfolyei* (Cogn. & Marche) Merr., is easily recognized by its once-pinnately compound leaves, the leaflets of which are conspicuously and coarsely serrate.

a. Leaves 3- or 4-pinnate, the leaflet margins mucronate-serrulate.................. 1. SCIADODENDRON
aa. Leaves simple or palmately compound.
  b. Flowers in umbels (in heads in *Dendropanax sessiliflorus* with bisexual flowers and some species of *Schefflera* with connate petals, compound leaves and conspicuously ligulate petiole), bisexual or polygamo-monoecious.
    c. Styles and locules 2, rarely 3; petioles dilated at the base into a coriaceous ligulate sheath.................. 2. DIDYMOPANAX
    cc. Styles and locules 5–9, usually 5.
      d. Leaves simple, the petiole without an obvious ligule; petals free. 3. DENDROPANAX
      dd. Leaves compound (simple only in *S. epiphytica* among our species), the petiole with a conspicuous coriaceous ligule; petals usually connate and calyptrate.................. 4. SCHEFFLERA
  bb. Flowers in heads, polygamo-dioecious (rarely polygamo-monoecious); petioles without an obvious ligule.................. 5. OREOPANAX

1. SCIADODENDRON Griseb.

SCIADODENDRON Griseb. in Bonplandia 6:7. 1858.

Shrubs or trees, glabrous throughout. Leaves 3- or 4-pinnate, the leaflets petiolulate; petioles subterete, swollen and somewhat sheathing at the base, seemingly estipulate. Inflorescences terminal on short branches, paniculate, the primary peduncle and rhachis stout, short, woody, the secondary peduncles and rhachises few, the floriferous peduncles bracteate, in several indefinite whorls; pedicels

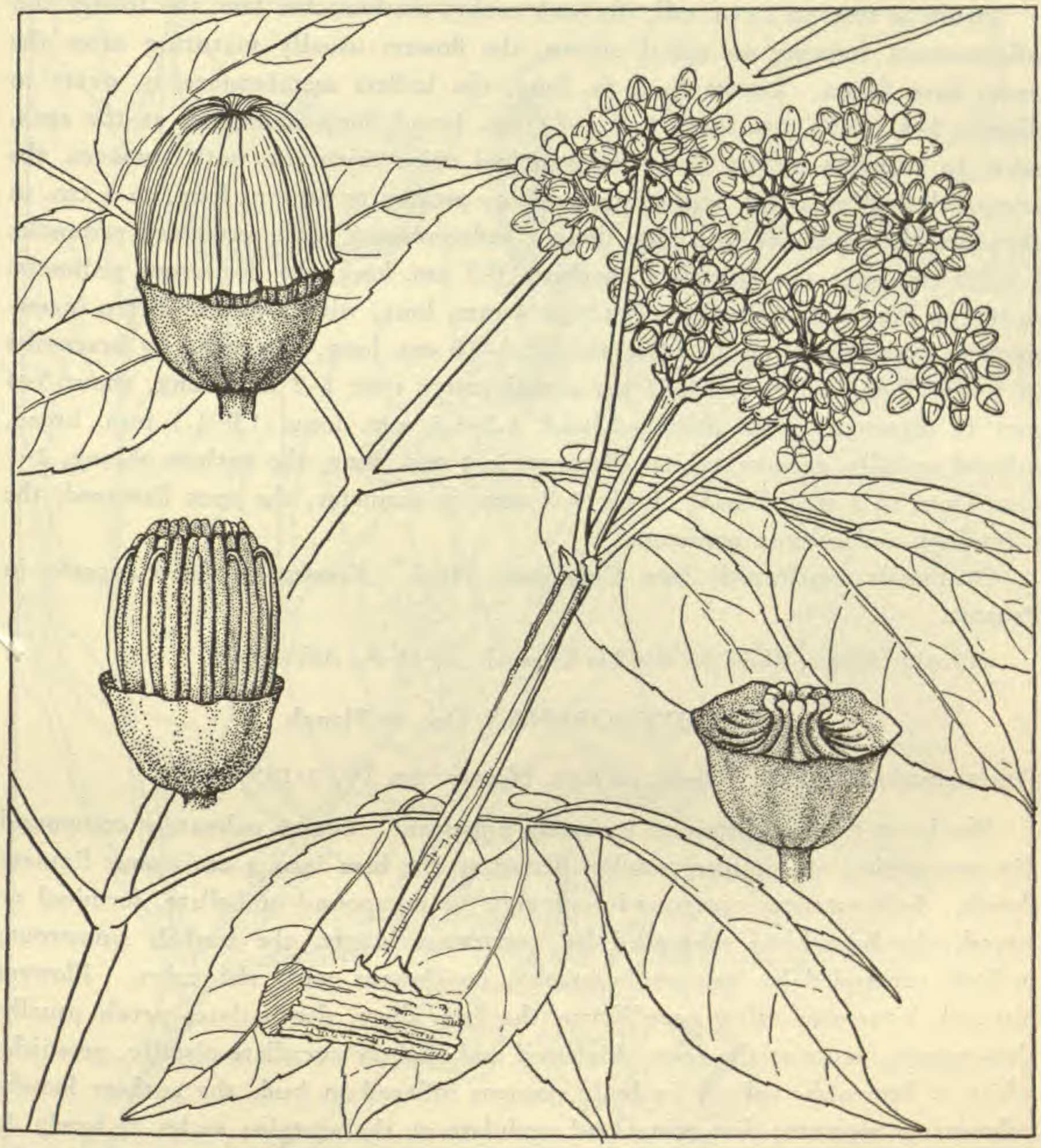

Fig. 100. *Sciadodendron excelsum*

bracteolate, inconspicuously articulated with the calyx tube. Flowers in umbels, bisexual; calyx cupuliform, the margin membranaceous, undulate or obscurely 4- to 7-dentate, the base fluted immediately above the attachment of the pedicel; petals 9–10, connate at their bases, imbricate in bud; stamens 9–12; disc fleshy; styles 9–12, connate below, forming a stout cylindrical column, free above, the stigmas in a ring at the apex of the column, the locules as many as the styles. Fruit subglobose, conspicuously costate.

A monotypic genus.

1. SCIADODENDRON EXCELSUM Griseb. in Bonplandia 6:7. 1858.

Reynoldsia americana Donn. Sm. in Bot. Gaz. 49:455. 1910.

Shrubs or trees to 20 m. tall, the bark corky, the branches few, the foliage and inflorescences forming an apical crown, the flowers usually maturing after the leaves have fallen. Leaves to 2 m. long, the leaflets membranaceous, ovate to elliptic, 3–8 (–15) cm. long, 1–5 (–7) cm. broad, long-acuminate at the apex, acute to truncate at the base, the principal veins raised on both surfaces, the primary lateral veins few, arcuate-ascending; petioles to 60 cm. long, to 1 cm. in diameter, the petiolules to 7 mm. long. Inflorescences with secondary peduncles 1.5–5.0 cm. long, the secondary rhachises 3–7 cm. long, the floriferous peduncles 4–10 cm. long, subtended by a bract to 6 mm. long, with a pair of often inconspicuous ovate bracts at the base; pedicels 3–10 cm. long, subtended by bracteoles to 3 mm. long. Flowers 15–35 per umbel; calyx tube 1–2 mm. long, about 3–4 mm. in diameter; petals oblong-deltoid, 1.5–3.5 mm. long, 1.0–1.5 mm. broad, inflexed apically, carnose, white; filaments 3–4 mm. long, the anthers oblong, 2–3 mm. long, to 1 mm. broad. Fruit 6–7 mm. in diameter, the apex flattened, the calyx-limb and column persistent.

Guatemala southwards into Colombia; Haiti. Known as *hobo lagarto* in Panama.

PANAMÁ: Chepo, *Kluge 50*; Río Las Lajas, alt. ca. 20 m., *Allen 1604*.

2. DIDYMOPANAX Dec. & Planch.

DIDYMOPANAX Dec. & Planch. in Rev. Hortic. ser. IV. 3:109. 1854.

Shrubs or trees, glabrous or variously pubescent. Leaves palmately compound (in our species) or simple; petioles dilated at the base into a coriaceous ligulate sheath. Inflorescences compound-paniculate or compound-umbellate, terminal or lateral, the branchlets subtended by coriaceous bracts, the umbels numerous; pedicels subtended by minute bracteoles, continuous with the calyx. Flowers bisexual, 5-merous; calyx cupuliform, the limb short, denticulate; petals usually thin-carnose, acute at the apex, thickened and slightly cucullate distally, greenish-white or brownish, valvate in bud; stamens inflexed in bud, the anthers loosely coherent or separate; disc raised and undulate at the margin; styles 2, rarely 3, carnose, distinct to the base or partially connate; ovary thick-walled, the locules and ovules the same number as the styles. Fruit laterally compressed, longitudinally bisulcate, surmounted by the persistent calyx-limb and the stylar column or recurved styles, the seeds 2, rarely 3.

a. Blades of the leaflets more than 2½ times as long as the petiolules, oblong or oblong-oblanceolate, more than twice as long as broad............ 1. D. MOROTOTONI
aa. Blades of the leaflets up to twice as long as the petiolules, broadly ovate, less than twice as long as broad............ 2. D. PITTIERI

1. DIDYMOPANAX MOROTOTONI (Aubl.) Dec. & Planch. in Rev. Hortic. ser. IV. 3:109. 1854.

Panax Morototoni Aubl. Pl. Guian. 949. 1775
Aralia micans Humb. & Bonpl. in Syst. Veg. 6:701. 1820.
Panax speciosum Eggers, Fl. St. Croix 59. 1879, not Willd.
Didymopanax micans (Humb. & Bonpl.) Krug & Urb. in Urb. Symb. Ant. 1:204. 1899.

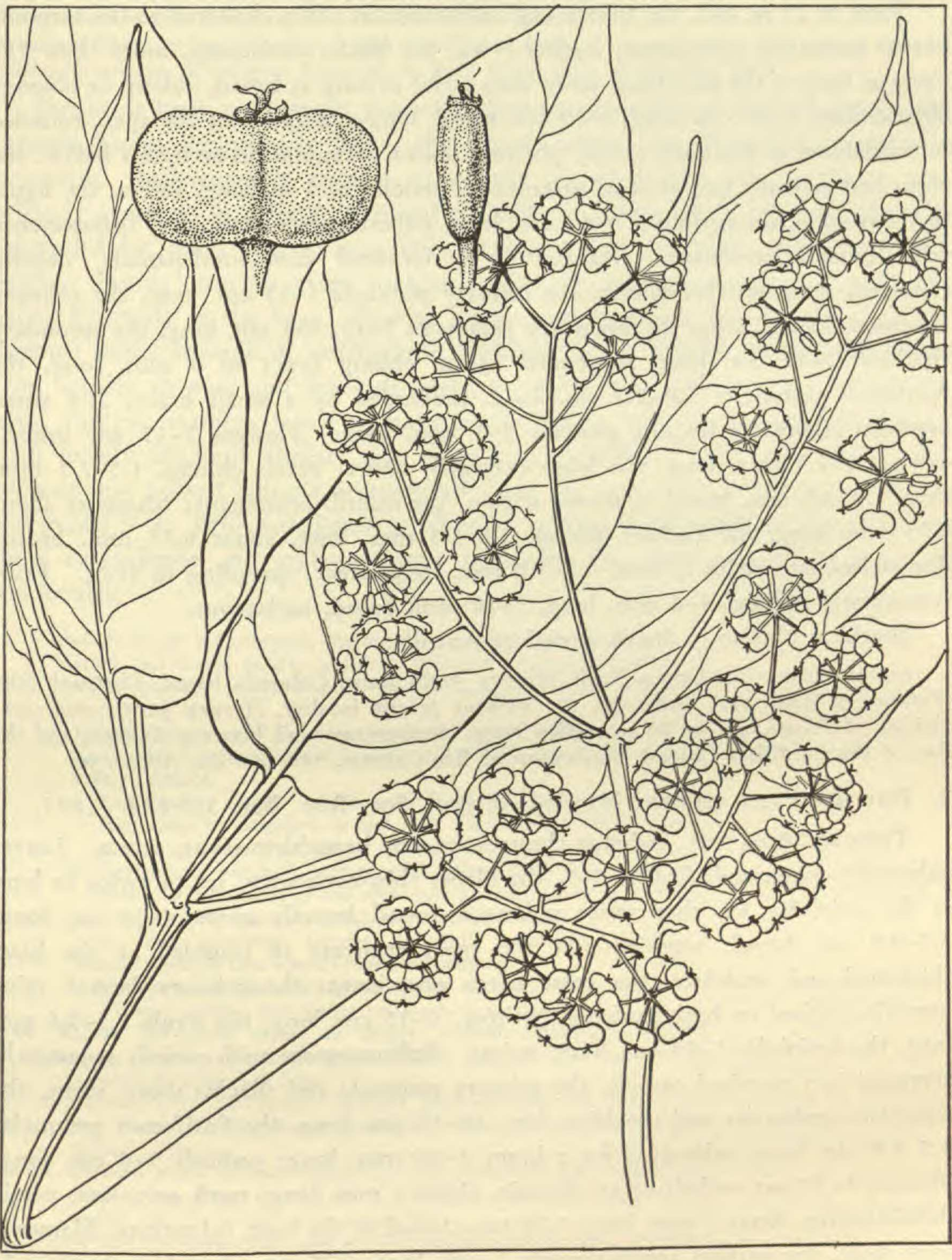

Fig. 101. *Didymopanax Morototoni*

Trees to 25 m. tall, the foliage and inflorescences often clustered at the summit. Leaves palmately compound; leaflets 7–12, the blades coriaceous, more than 2½ times as long as the petiolules, more than twice as long as broad, oblong or oblong-oblanceolate, 8–45 cm. long, 3–19 cm. broad, long-acuminate at the apex, rounded to subcordate at the base, entire, glabrous above, ferrugineous-sericeous below, the costa and primary lateral veins prominent; petioles to 1 m. long, terete, the ligule to 1 cm. long, the petiolules 3–14 cm. long, puberulent or glabrous. Inflorescence with umbels racemosely arranged in a terminal compound-panicle, densely canescent-sericeous throughout, the primary peduncle 3–15 cm. long, the primary rhachis 6–30 cm. long, the secondary peduncles 7–15, 1–3 cm. long, the secondary rhachises 2–12 cm. long, subtended by an oblong bract to 5 mm. long, the floriferous peduncles 1.0–2.5 cm. long, subtended by a small bract, 2–4 times bracteate along its length; pedicels 2–5 mm. long. Flowers 7–15 per umbel; calyx 1.0–1.5 mm. long, the lobes extremely short; petals oblong, 1.5–2.5 mm. long, 1.0–1.5 mm. broad, glabrous within, the midrib prominent; filaments about 0.75 mm. long, the anthers oblong, 1.0–1.5 mm. long, about 0.75 mm. broad; disc pubescent; styles 2, free, 0.5–1.0 mm. long, erect, spreading in fruit. Fruit transversely oblong, 4–6 mm. long, 7–10 mm. broad, coriaceous.

Southern Mexico to South America; Antilles.

CANAL ZONE: Las Cruces Trail, *Harvey 5049*; Barro Colorado Island, *Shattuck 669*, *Wetmore & Abbe 111*, *Aviles 27*, *53*; without precise locality, *Harvey 5115*. PANAMÁ: vicinity of Pacora, alt. ca. 35 m., *Allen 1114*. VERAGUAS: trail between Cañazas and the foot of the Cordillera Central, headwaters of Río Cañazas, 300–600 m., *Allen 150*.

2. **Didymopanax pittieri** Marchal, in Bull. Soc. Roy. Bot. 30^1:280. 1891.

Trees to 20 m. tall, glabrous throughout, the branchlets stout, terete. Leaves palmately compound; leaflets 5–9, the blades thin-coriaceous, up to twice as long as the petiolules, less than twice as long as broad, broadly ovate, 4–14 cm. long, 3.5–9.0 cm. broad, acuminate at the apex, truncate to rounded at the base, thickened and undulate, the costa often prominent, the primary lateral veins spreading, raised on both surfaces; petioles 10–35 cm. long, the ligule 1.5–3.0 cm. long, the petiolules 3–10 cm. long, striate. Inflorescences with umbels racemosely arranged in a terminal panicle, the primary peduncle and rhachis short, stout, the secondary peduncles and rhachises few, 10–35 cm. long, the floriferous peduncles 1.5–3.0 cm. long, subtended by a bract 3–16 mm. long; pedicels 3–6 cm. long. Flowers 7–20 per umbel; calyx obconic, about 1 mm. long, teeth apiculate; petals deltoid-ovate, about 2 mm. long, 1.25 mm. broad at the base, calyptrate; filaments very short, the anthers approximately 1 mm. long, 0.75 mm. broad; styles 2 or 3, apically free. Fruit subglobose, 2.5–4.0 mm. in diameter, the stigmas slightly divaricate.

Costa Rica and Panama.

CHIRIQUÍ: humid forest of Cuesta de Las Palmas, southern slope of Cerro de la Horqueta, alt. 1700–2100 m., *Pittier 3212*.

3. DENDROPANAX Dec. & Planch.

Dendropanax Dec. & Planch. in Rev. Hortic. ser. IV. 3:107. 1854.

Gilibertia R. & P. Fl. Per. Prodr. 50. 1794, not J. F. Gmel.
Wangenheimia Dietr. in Lex. 10:536. 1810, not Moench.
Ginannia Dietr. in Lex. Nachtr. 3:483. 1817, not Scop.
Gilibertia subgen. *Melopanax* Marchal, in Bull. Acad. Belg. II. 47:77. 1879.

Shrubs or trees, our species generally glabrous throughout. Leaves simple, the juvenile blades occasionally lobed, the mature blades usually entire; apparently estipulate. Inflorescences with 2–20 umbels (rarely heads) racemosely or umbellately arranged in a single terminal or axillary umbel, the floriferous peduncles subtended by small bracts, sometimes bracteate and articulate above the base, swollen distally into an often carnose receptacle; pedicels continuous with the calyx, bracteate at the base. Flowers bisexual or polygamo-monoecious, 5- to 9-merous; calyx obconic or cupuliform, the limb short, usually denticulate; petals free, usually carnose and greenish-white, subacute and slightly cucullate at the apex, valvate; stamens twice as many as the petals, inflexed in bud, the anthers with loosely coherent thecae; disc short-conic, confluent with the styles; style connate into a short column or essentially free, the ovary thick-walled, the locules and ovules 5–9. Fruit subglobose or ellipsoid, sulcate, surmounted by the persistent short calyx-limbs and stylar column or styles, the seeds usually as many as the locules.

a. Umbels 3–20 per inflorescence, racemosely or umbellately arranged.
  b. Mature leaf-blades entire, undulate, remotely crenate-denticulate or serrate; primary peduncle plus rhachis 1–10 cm. long; calyx not broader than long.
    c. Inflorescence usually terminal; peduncles striate or smooth, without horizontal fissures, not (or rarely) jointed, the bracts (if present) rarely connate.
      d. Leaf-blades entire, undulate or remotely crenate, obtusely acuminate or cuspidate at the apex (the acumen rarely slender and then scarcely exceeding 15 mm. in length) .... 1. D. ARBOREUS
      dd. Leaf-blades remotely serrate with linear teeth 1–4 mm. long, slenderly acuminate at the apex (the acumen 15–25 mm. long). 2. D. STENODONTUS
    cc. Inflorescence terminal or lateral; peduncles rugose, often marked with short transverse fissures, uniformly articulate, the bracts usually connate into a small coriaceous cupule.
      e. Flowers pedicellate; leaf-blades entire or undulate .... 3. D. GONATOPODUS
      ee. Flowers sessile; leaf-blades undulate to serrate .... 4. D. SESSILIFLORUS
  bb. Mature leaf-blades entire or deeply 3-lobed, irregularly sinuate-serrate; primary peduncle plus rhachis 0.5–1.3 cm. long; calyx somewhat broader than long.
    f. Flowers 6–15 per umbel; primary peduncle plus rhachis 0.5–1.3 cm. long, the floriferous peduncles about 6 per inflorescence; pedicels glabrous .... 5. D. PRAESTANS
    ff. Flowers about 50 per umbel; primary peduncle plus rhachis less than 1 cm. long, the floriferous peduncles about 12 per inflorescence; pedicels ferrugineous-puberulent .... 6. D. ALBERTI-SMITHII
aa. Umbel solitary (rarely with one or two smaller inconspicuous secondary umbels).
    g. Floriferous peduncle 0.5–2.5 cm. long; pedicel 3–15 mm. long .... 7. D. QUERCETI
    gg. Floriferous peduncle at least 3 cm. long; pedicel 25–35 mm. long. 8. D. DARIENENSIS

1. DENDROPANAX ARBOREUS (L.) Dec. & Planch. in Rev. Hortic. ser. IV. 3:107. 1854.

Aralia arborea L. Syst. Nat. ed. 10. 967. 1759.
Hedera arborea (L.) Sw. Fl. Ind. Occ. 1:518. 1797.
Hedera alaris Schlecht. in Linnaea 9:605. 1834.

Dendropanax alare Dec. & Planch. in Rev. Hortic. ser. IV. 3:107. 1854.
Sciadophyllum jacquini Griseb. Fl. Br. W. Ind. 306. 1860.
Dendropanax juergenseni Seem. in Journ. Bot. 2:301. 1864.
Sciandophyllum samydifolium Wr. ex Griseb. Cat. Pl. Cub. 117. 1866.
Dendropanax samydifolium (Wr. ex Griseb.) Seem. in Journ. Bot. 6:140. 1868.
Gilibertia langeana Marchal, in Bull. Acad. Belg. II. 47:79. 1879.
Sciadophyllum capitatum Eggers, in Vidensk. Meddel. 1889:17. 1889.
Schefflera arborea (L.) Maza, in Anal. Soc. Esp. Hist. Nat. 19:249. 1890.
Schefflera samydifolia (Wr. ex Griseb.) Maza, loc. cit. 1890.
Gilibertia arborea (L.) Marchal, in Bull. Soc. Roy. Bot. Belg. 30^1:281. 1891.
Sciodaphyllum arboreum (L.) Hitchc. in Rep. Mo. Bot. Gard. 4:91. 1893.
Aralia fruticosa Sessé & Moç. Fl. Mex. 86. 1894.
Aralia tuxtlensis Sessé & Moç. loc. cit. 1894.
Gilibertia rothschuhii Harms, in Engl. Bot. Jahrb. 23:126. 1896.
Gilibertia insularis Rose, in N. Am. Fauna 14:83. 1899.
Gilibertia samydifolia (Wr. ex Griseb.) March. ex Urb. Symb. Ant. 1:201. 1899.
Gilibertia brachypoda Urb. loc. cit. 5:452. 1908.
Dendropanax brachypodum (Urb.) R. C. Schneid. in Bull. Torrey Club 36:644. 1909.
Dendropanax insulare R. C. Schneid. loc. cit. 1909.
Gilibertia stenocarpa Donn. Sm. in Bot. Gaz. 55:435. 1913.
Gilibertia smithiana I. M. Johnston, in Contrib. Gray Herb. 70:81. 1924.
Gilibertia eurycarpa I. M. Johnston, loc. cit. 82. 1924.
Gilibertia alaris (Schlecht.) J. M. Johnston, loc. cit. 1924.
Dendropanax langeanum (March.) Standl. in Contrib. U. S. Nat. Herb. 23:1084. 1924, as syn.
Gilibertia juergenseni (Seem.) Standl. loc. cit. 1924.
Dendropanax monticola Standl. in Journ. Wash. Acad. 17:316. 1927.
Gilibertia concinna Standl. in Trop. Woods 18:30. 1929.
Gilibertia matudai Lundell, in Phytologia 1:372. 1940.
Dendropanax matudai (Lundell) A. C. Smith, in Trop. Woods 66:3. 1941.

Shrubs or trees to 15 m. tall, the branchlets slender, terete. Juvenile leaves often 3- or 4-lobed, to 45 cm. in diameter; petioles to 40 cm. long; mature leaves ovate to elliptic, oblong or obovate-oblong, 6–29 (usually about 15) cm. long, 3–9 (usually about 7) cm. broad, obtusely acuminate to cuspidate at the apex, cuneate to obtuse at the base, entire to undulate or remotely crenate, the costa generally prominent, the primary lateral veins 4–8, often raised on both surfaces. Inflorescences of 3 or more umbels arranged in a terminal raceme, the primary peduncle to 2.5 cm. long, the primary rhachis 2.0–6.5 cm. long, the floriferous peduncles 1–6 cm. long, with several small bracts along their length; pedicels 3–13 mm. long. Flowers to 45 per umbel, 5- to 7-merous, greenish-white; calyx 1.5–2.0 mm. long, minutely denticulate or merely undulate; petals oblong or deltoid-oblong, 1.5–2.0 mm. long, 0.75–1.5 mm. broad, carnose, midrib prominent within, reflexing during anthesis; filaments 1.5–3.0 mm. long, the anthers subglobose-oblong, 0.5–1.0 mm. long, 0.5–0.75 mm. broad; styles connate, free at the apex. Fruit 4–8 mm. in diameter, purple; seeds 5–7.

Sinaloa to Tamaulipas, Cuba, Puerto Rico, and southward; also in South America. A common variable species.

BOCAS DEL TORO: region of Almirante, *Cooper s. n.* CANAL ZONE: Chagres, *Fendler 131*; Barro Colorado Island, *Bangham 430, 595, Starry 294, Shattuck 1026, Aviles 69, 959, Bailey & Bailey 375.* CHIRIQUÍ: Progreso, *Cooper & Slater 173*; llanos west of Gualaca, alt. 500 ft., *Allen 5049*; Río Chiriquí Viejo valley, between El Volcán & Cerro Punta, *G. White 15.* COCLÉ: between Las Margaritas and El Valle, *Woodson, Allen & Seibert*

1741; region north of El Valle de Antón, alt., 1000 m., *Allen 3722, 3747*; vicinity of El Valle, 800–1000 m., *Allen 778*. LOS SANTOS: between Los Santos and Guarate, *Woodson, Allen & Seibert 1202*. PANAMÁ: Cerro Campana, *Allen 2680*. VERAGUAS: vicinity of Ocú, alt. 100 m., *Allen 3648*.

2. DENDROPANAX STENODONTUS (Standl.) A. C. Smith, in Trop. Woods 66:3. 1941.

Gilibertia stenodonta Standl. in Ann. Mo. Bot. Gard. 24:196. 1937.

Shrubs about 4 m. tall, the branchlets slender. Leaves oblong or oblong-oblanceolate, 14–22 cm. long, 4–7 cm. broad, slender-acuminate at the apex, acute at the base, remotely serrate with spreading or ascending linear teeth 1–4 mm. long, the costa prominent, the larger primary lateral veins 4–8 per side; petiole 1.5–7.5 cm. long. Inflorescences of 3 to 6 umbels arranged in a terminal raceme, the primary peduncle slender, 0.5–1.0 cm. long, the primary rhachis 1.5–2.0 cm. long, the floriferous peduncles 1.5–2.5 cm. long, often with several small bracts near their middle; pedicels 4–5 mm. long. Flowers 15–25 per umbel, 5-merous, greenish-cream; calyx about 1 mm. long, obscurely denticulate; petals deltoid-oblong, about 1.5 mm. long, 0.75 mm. broad; filaments to 1.5 mm. long, the anthers subglobose, 0.75 mm. long, 0.5 mm. broad; styles connate, free at the apex. Fruit unknown.

Known only from the type locality.

CANAL ZONE: vicinity of Gold Creek, 4 miles northeast of Gamboa, *Seibert 592*.

3. DENDROPANAX GONATOPODUS (Donn. Sm.) A. C. Smith, in Trop. Woods 66:3. 1941.

Gilibertia gonatopoda Donn. Sm. in Bot. Gaz. 55:434. 1913.

Trees to 16 m. tall, the branchlets stout, terete. Leaves thin-coriaceous, ovate to elliptic, 10–30 cm. long, 4–18 cm. broad, acute to acuminate at the apex, acute to rounded at the base, entire or undulate, the costa prominent, the primary lateral veins 8–10 per side, more or less straight, spreading; petioles 1–12 cm. long. Inflorescences of 4–16 umbels racemosely or umbellately arranged, terminal or lateral, the primary peduncle stout, 0.5–2.0 cm. long, the primary rhachis 0.5–3.0 cm. long, the floriferous peduncles 2–8 cm. long, bracteate and articulate in the lower one-third to one-half; pedicels 2–12 mm. long. Flowers 15–50 per umbel, 5-merous; calyx obconic, 2 mm. long, 1.5 mm. in diameter; petals oblong, 1.5–2.0 mm. long, 1.0–1.5 mm. broad; filaments carnose, 1–2 mm. long, the anthers subglobose-oblong, small; styles connate, forming a short column, free apically. Fruit subglobose, 3–4 mm. in diameter, the styles free and recurved in the distal half; seeds 5.

Costa Rica and Panama.

BOCAS DEL TORO: region of Almirante, *Cooper 380*. CHIRIQUÍ: Bajo Chorro, Boquete District, el. 6000 ft., *Davidson 90*.

4. DENDROPANAX SESSILIFLORUS (Standl. & A. C. Smith) A. C. Smith, in Trop. Woods 66:3. 1941.

Gilibertia sessiliflora Standl. & A. C. Smith, in Ann. Mo. Bot. Gard. 27:326. 1940.

Trees, the branchlets stout. Leaves chartaceous or thin-coriaceous, broadly elliptic, 11–21 cm. long, 7–13 cm. broad, acute at the apex, obtuse at the base, undulate to serrate, the costa prominent, the primary lateral veins 6–10 per side, arcuate-ascending; petioles 1–7 cm. long. Inflorescences of 6–10 heads arranged in a condensed terminal raceme, the primary peduncle 0.5 cm. long, the primary rhachis 0.5 cm. long, the floriferous peduncles 3–4 cm. long, with several connate bracts at about the middle, articulated immediately above the bracts. Flowers 10–15 per head, 5-merous; calyx 2–3 mm. long, about 2 mm. in diameter, the lobes deltoid, acute, about 0.7 mm. long; petals deltoid-lanceolate, 2.5–3.0 mm. long, 1.0–1.5 mm. broad, acute and inflexed at the apex; filaments 3 mm. long, the anthers subglobose-oblong, about 0.75 mm. long; styles connate, the stigmas more or less distinct.

Known only from Panama.

CHIRIQUÍ: Boquete District, el. 3800 ft., *Davidson 769*. SAN BLAS: forest around Puerto Obaldía, alt. 0–50 m., *Pittier 4278*.

5. DENDROPANAX PRAESTANS Standl. in Journ. Wash. Acad. 17:316. 1927.

Gilibertia praestans (Standl.) A. C. Smith, in Brittonia 2:251. 1936.

Small trees, the branchlets rugose, densely leafy at the tips. Juvenile leaves suborbicular, to 40 cm. in diameter, deeply 5- to 7-lobed, serrate; petioles 20–25 cm. long; mature leaves entire or deeply 3-lobed, the entire blades ovate-oblong, 6–13 cm. long, 2–6 cm. broad, acuminate at the apex, obtuse or cuneate at the base, irregularly sinuate-serrate, the teeth obtuse, frequently unequal, the 3-lobed blades 8–15 cm. long and broad, the lobes narrowly oblong, 1.5–3.0 cm. broad, attenuate at the apex, irregularly sinuate, the costa prominent, the primary lateral veins about 6 per side; petioles 1.5–8.0 cm. long. Inflorescences of 5–10 umbels arranged in an axillary compound umbel, the primary peduncle plus rhachis stout, 0.5–1.3 cm. long, the floriferous peduncles about 6 per inflorescence, 1.0–2.5 cm. long, subtended by several more or less connate bracts forming a basal cupule; pedicels 3–5 mm. long, subtended by several more or less connate bracteoles. Flowers 6–15 per umbel, 5- to 7-merous; calyx obconic, somewhat broader than long, 1.5–2.0 mm. long, about 3 mm. in diameter, the teeth apiculate; petals deltoid-oblong, 2–3 mm. long, about 1.5 mm. broad; filaments 1–2 mm. long, the anthers 1.25–1.5 mm. long, 1 mm. broad; styles basally connate. Fruit subglobose, 4–5 mm. in diameter, the styles recurved distally.

Costa Rica and western Panama, 1700–2300 m.

CHIRIQUÍ: humid forest between Alto de las Palmas and top of Cerro de la Horqueta, alt. 2100–2268 m., *Pittier 3213*.

6. DENDROPANAX **alberti-smithii** Nevl. spec. nov.

Arbores usque 30 m. altae; ramulis teretibus rugosis. Folia simplicia oblongo-elliptica usque late obovato-ovalia 10.0–18.5 cm. longa 5–12 cm. lata apice rotundata nisi obscure retusa basi rotundato-cuneata margine obscure repanda coriacea glabra; petiolo 0.5–8.0 cm. longo. Inflorescentia ex umbellis 12–18

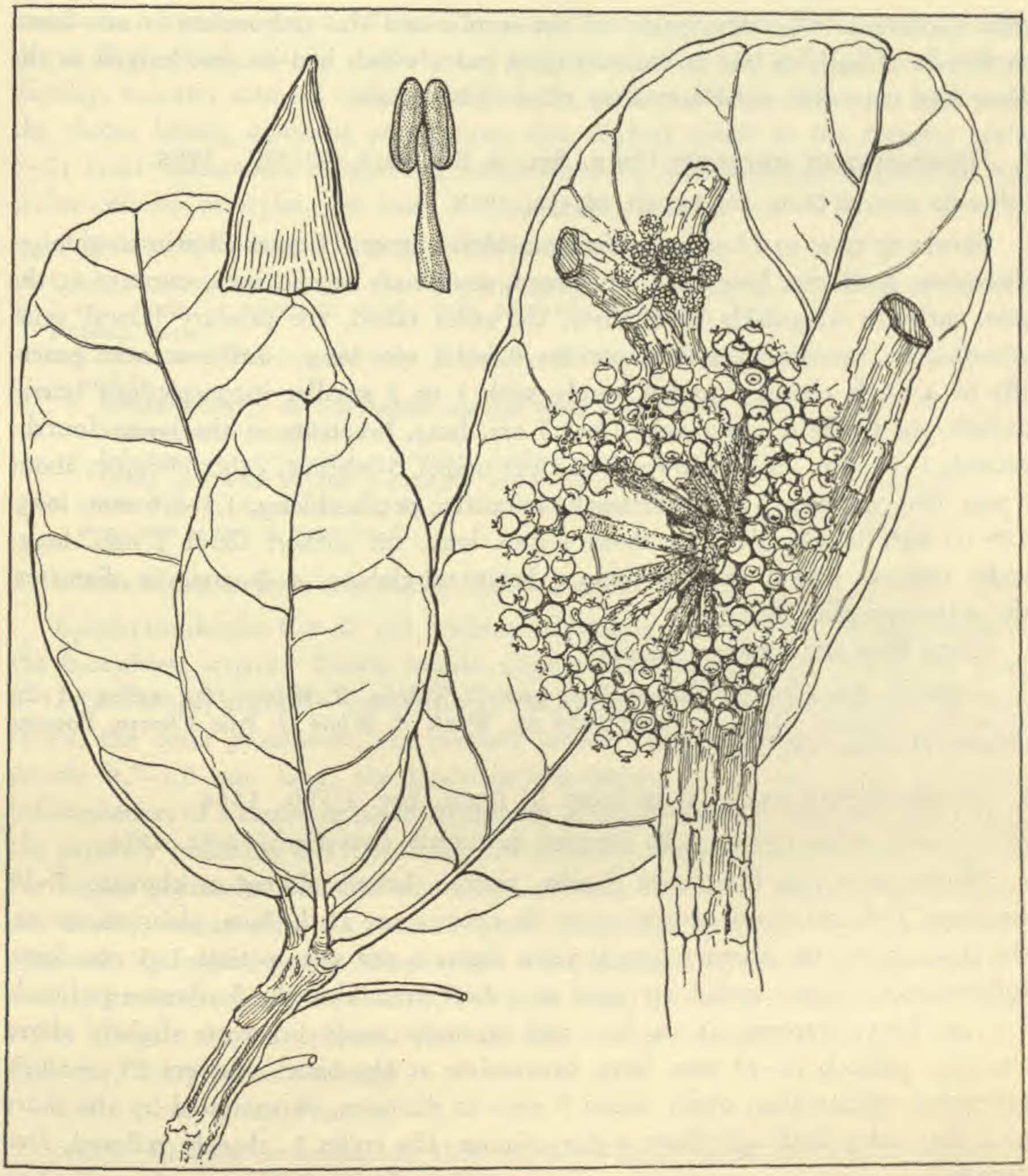

Fig. 102. *Dendropanax alberti-smithii*

umbellate composita subsessilis rhachide obsoleta; pedunculis 2–3 cm. longis apice conspicue dilatatis ibique florigeris; pedicellis 2–5 cm. longis ferrugineo-puberulis a cupula bracteolari subtengentibus. Flores circa 50 per umbellam 5–7-meri; calyce cupuliformi; petalis oblongo-deltoidis ca. 2 mm. longis basi 1 mm. latis; staminorum filamentis circa 1 mm longis, antheris 1 mm. longis 0.75 mm. latis; stylis 7 inferne coalitis. Bacca subglobosa ca. 4 mm. longa purpurea; stylis persistentibus apice recurvis.

COCLÉ: region north of El Valle de Antón, alt. 1000 m., *Allen 3738* (MO, HOLOTYPE).

Two inflorescences are present on the type specimen, one fruiting and the other

very immature. The description of the corolla and the androecium is not based on flowers at anthesis but on isolated floral parts which had become lodged in the dense and somewhat moss-encrusted older inflorescense.

7. DENDROPANAX QUERCETI Donn. Sm. in Bot. Gaz. 42:297. 1906.

Gilibertia querceti Donn. Sm. loc. cit. 55:436. 1913.

Shrubs or trees to 17 m. tall, the branchlets rugose. Leaves elliptic to oblong-lanceolate, 5–13 cm. long, 2–5 cm. broad, acuminate at the apex, cuneate at the base, entire or irregularly denticulate, the costa raised, the primary lateral veins prominulous, arcuate-ascending; petioles 0.5–4.5 cm long. Inflorescences generally of a single terminal umbel, rarely with 1 or 2 smaller inconspicuous lateral umbels, the floriferous peduncle 0.5–2.5 cm. long, bracteate in the lower fourth; pedicels 3–15 mm. long. Flowers 5–35 per umbel, 5-merous; calyx obconic, about 2 mm. long and broad, the teeth small, apiculate; petals oblong, 1.5–2.0 mm. long, 1.0–1.5 mm. broad; filaments about 1 mm. long, the anthers about 1 mm. long; styles connate into a short column. Fruit subglobose, 4–7 mm. in diameter, the styles spreading distally.

Costa Rica and western Panama.

CHIRIQUÍ: Río Chiriquí Viejo valley, near El Volcán, *P. White 169*; valley of the upper Río Chiriquí Viejo, alt. 1300–1900 m., *White & White 9*; Bajo Chorro, Boquete District, *Davidson 176, 210, 450*.

8. DENDROPANAX DARIENENSIS Seem. in Journ. Bot. 2:300. 1864.

Gilibertia darienensis (Seem.) I. M. Johnston, in Contrib. Gray Herb. 70:82. 1924.

Slender trees, the branchlets slender, terete. Leaves oblong or obovate, 7–14 cm. long, 3–7 cm. broad, acuminate at the apex, acute at the base, glabrous, entire, the costa raised, the primary lateral veins about 6 per side; petiole 1–5 cm. long. Inflorescence a simple umbel, terminal on a short branchlet, the floriferous peduncle 3–6 cm. long, bracteate at the base and inconspicuously bracteate slightly above the base; pedicels 25–35 mm. long, bracteolate at the base. Flowers 15 (–30 ?) per umbel; young fruit ovoid, about 5 mm. in diameter, surmounted by the short persistent calyx-limb and short stylar column, the styles 5, sharply reflexed, free distally.

Known only from the type collection.

DARIEN: without precise locality, *Seemann s. n.*

4. SCHEFFLERA Forst.

SCHEFFLERA Forst. Char. Gen. 45. 1776, *nomen conservandum*.
Sciodaphyllum P. Br. Hist. Jam. 190. 1756, *nomen rejiciendum*.
Sciadophyllum Reichenb. Consp. 145. 1828.

Shrubs or small trees, sometimes epiphytic, glabrous or variously pubescent. Leaves palmately compound or rarely simple; petiole dilated at the base into a ligulate sheath, often very conspicuous. Inflorescences paniculately umbelliferous or capituliferous, terminal or lateral, the branches subtended by small coriaceous bracts, the umbels or heads numerous; pedicels continuous with the calyx. Flowers bisexual, 5-merous; calyx obconic or cupuliform, the limb short, erect, usually denticulate; petals usually connate and calyptrate, subacute and slightly thickened distally, valvate; stamens inflexed in bud, the anthers oblong, obtuse at both ends, the thecae loosely coherent or separate; disc slightly raised at the margin; styles 5–7; fruit coriaceous, subglobose, surmounted by the persistent calyx-limb and stylar column or styles, the seeds 5–7 or fewer, oblong.

A genus containing a large number of variable species.

a. Epiphytic shrubs with simple, short-petiolate leaves.................................. 1. S. EPIPHYTICA
aa. Trees, shrubs or epiphytic shrubs with palmately compound, long-petiolate leaves.
  b. Leaflets 5–9; flowers distinctly pedicellate in 5- to 14-flowered umbels.
    c. Inflorescences 1- to 3-branched near the base; leaflets 5–9; petiolules shallowly canaliculate.................................. 2. S. SYSTYLA
    cc. Inflorescences compound-paniculate; leaflets 5 or 6; petiolules terete, somewhat swollen proximally and distally.................................. 3. S. SEIBERTII
  bb. Leaflets 8–21; flowers sessile, in 10- to 12-flowered heads (fruit sometimes as few as 5 per head).................................. 4. S. ROBUSTA

1. SCHEFFLERA EPIPHYTICA A. C. Smith, in Ann. Mo. Bot. Gard. 28:437. 1941.

Epiphytic shrubs 1–2 m. tall, glabrous throughout except for the inflorescence, the branchlets striate. Leaves simple, elliptic to elliptic-oblong, 18–25 cm. long, 8–12 cm. broad, abruptly acuminate at the apex, obtuse to subcordate at the base, entire, the costa prominent, the primary lateral veins 10–16 per side, spreading; petiole 0.7–3.0 cm. long, the ligule oblong-linear, to 2.5 cm. long, persistent. Inflorescences of a dozen or more racemosely arranged umbels, terminal, puberulent, the primary peduncle 6–8 cm. long, the primary rhachis 7.5–12.0 cm. long, the floriferous peduncles 0.5–1.0 cm. long; pedicels 2–6 mm. long. Flowers 3–12 per umbel; calyx obconic, 1.0–1.5 mm. long and slightly broader, the limb obscurely apiculate; petals connate into a semiglobose umbonate calyptra 2.0–2.5 mm. in diameter; filaments slender, 4–7 mm. long, the anthers about 1.5 mm. long; styles connate into a column, free apically. Fruit subglobose, to 3.5 mm. in diameter, conspicuously costate.

Known only from Panama.

COCLÉ: El Valle de Antón, alt. 1000 m., *Allen 3423*; region north of El Valle, trail to La Mesa, alt. about 1000 m., *Allen 2723*.

2. SCHEFFLERA SYSTYLA (Donn. Sm.) Viguier, in Ann. Sci. Nat. ser. IX. 9:363. 1909.

Sciadophyllum systylum Donn. Sm. in Bot. Gaz. 31:113. 1901.

Shrubs or trees to 10 m. tall, the branchlets terete, rugose. Leaves palmately compound; leaflets 5–9, the blades elliptic to oblong-oblanceolate, 10–25 cm. long, 3–9 cm. broad, long-acuminate at the apex, acute, cuneate or rounded at the base, both surfaces glabrous, serrate, undulate or entire, the costa prominent, the primary lateral veins 12–18 per side, arcuate-ascending; petioles 12–14 (–30) cm. long, ferrugineous-puberulent becoming glabrescent, the ligule oblong-lanceolate, to 8 cm. long, the petiolules 0.5–6.0 cm. long, canaliculate, densely to sparsely ferrugineous-puberulent. Inflorescences with umbels racemosely arranged in a 1- to

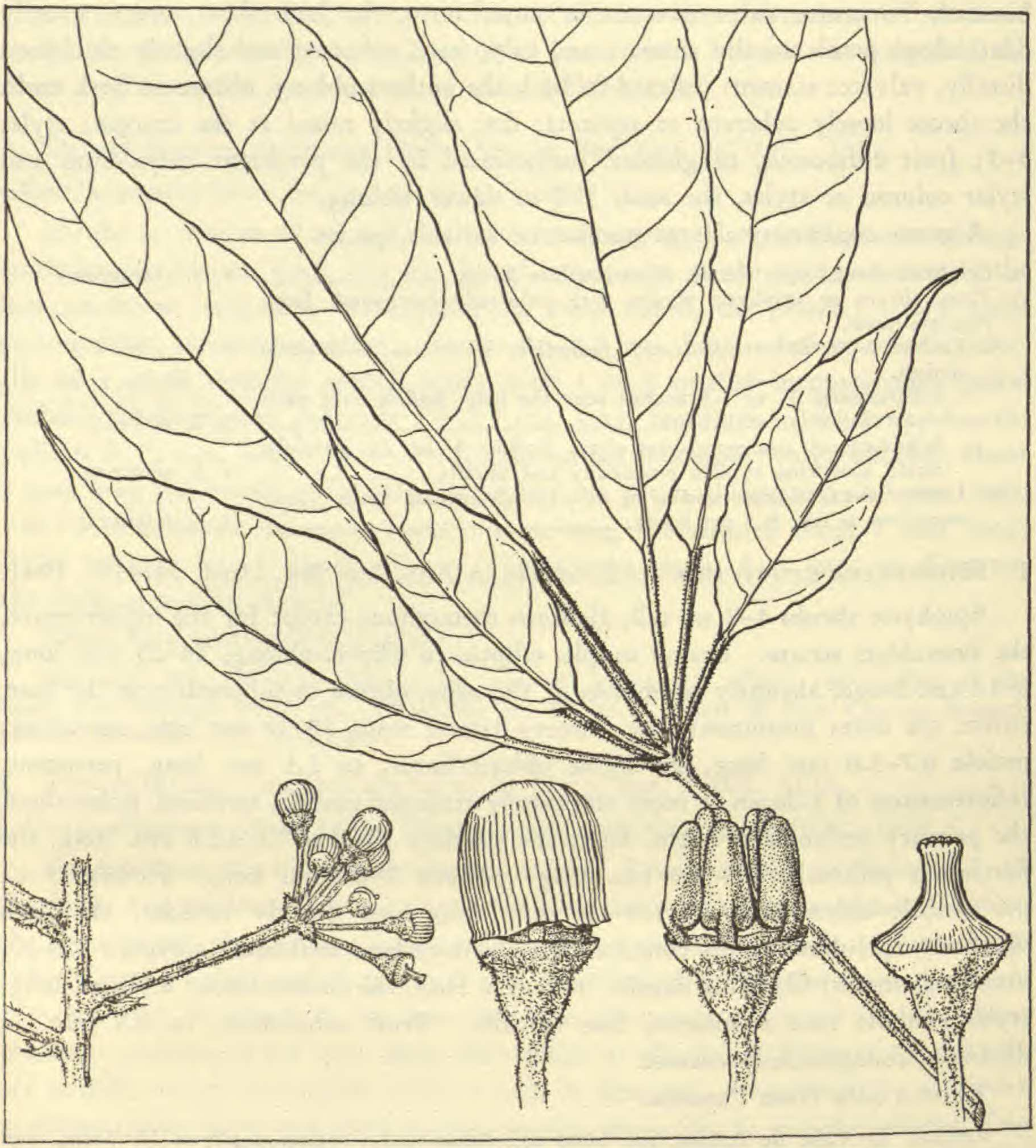

Fig. 103. *Schefflera systyla*

3-branched terminal panicle, ferrugineous-puberulent, the primary peduncle about 5 cm. long, the primary rhachis to 30 cm. long, the floriferous peduncles numerous, 6–15 mm. long, subtended by a bract to 3 mm. long; pedicels 1.5–3.0 (–5.0) cm. long. Flowers 7–10 per umbel; calyx obconic, 1 mm. long, the limb truncate; petals 2 mm. long, connate and calyptrate; filaments to 3 mm. long, the anthers approximately 1 mm. long, 0.5 mm. broad; styles 5–7, connate to the apex. Fruit sharply angled, 2.5–4.0 mm. in diameter, the styles often minutely spreading at the apex, the seeds 5–7 or fewer.

Costa Rica and Panama.

BOCAS DEL TORO: vicinity of Chiriquí Lagoon, Fish Creek Hills, *Von Wedel 2200, 2294, 2438*. COCLÉ: Cerro Pajita, hills north of El Valle de Antón, 1000–1200 m., *Allen & Allen 4194*.

3. SCHEFFLERA SEIBERTII A. C. Smith, in Trop. Woods 66:5. 1941.

Shrubs or trees to 5 m. tall, the branchlets stout, terete. Leaves palmately compound; leaflets 5 or 6, the blades more or less elliptic-oblong, 15–30 cm. long, (6–) 8–11 cm. broad, cuspidate to acuminate at the apex, obtuse to subcordate at the base, both surfaces glabrous, entire, the costa prominent, the primary lateral veins 7–12 per side, arcuate; petioles to 32 cm. long, lenticellate, the ligule oblong-linear, to 11 cm. long, the petiolules 2–8 cm. long, subterete, somewhat swollen proximally and distally. Inflorescences of racemosely arranged cymes on a terminal panicle, ferrugineous-puberulent, the primary peduncle plus rhachis to 15 cm. long, the secondary peduncles and rhachises about 12, to 50 cm. long, subtended by an oblong-linear bract to 3.5 cm. long, the floriferous peduncles many, 7–10 mm. long, subtended by a bract to 1 mm. long; pedicels 3.0–4.5 mm. long. Flowers 7–14 per umbel; calyx cupuliform, about 0.5 mm. long, the limb minutely denticulate; petals about 2 mm. long, connate and calyptrate; filaments 1.5–2.0 mm. long, the anthers approximately 1 mm. long, 0.75 mm. broad; styles 5, free at the apex.

Panama.

CHIRIQUÍ: Chiriquicito, United Fruit Co., vicinity Guarumo River, *Seibert 1553*.

4. SCHEFFLERA ROBUSTA (A. C. Smith) A. C. Smith, in Trop. Woods 66:5. 1941.

Sciadophyllum robustum A. C. Smith, in Brittonia 2:254. 1936.

Shrubs or trees to 13 m. tall, sometimes epiphytic, the young parts cinereo-puberulent, becoming glabrous, the branchlets stout, terete. Leaves palmately compound, 8–21 leaflets, the blades oblong-lanceolate, 8–30 cm. long, 4–11 cm. broad, caudate-acuminate at the apex, obtuse to rounded at the base, undulate, the costa prominulous, the primary lateral veins 8–20 per side; petioles to 55 cm. long, sheathing at the base, lenticellate, the ligule oblong-lanceolate, to 9 cm. long, the petiolules 2–20 cm. long. Inflorescences with heads borne racemosely in a large terminal panicle, the primary peduncle about 1 cm. long, the primary rhachis 10–15 cm. long or longer, the secondary peduncles 1–2 cm. long, the secondary rhachises to 50 cm. long, the floriferous peduncles 0.5–1.0 cm. long. Flowers 10–20 per head, glabrous; calyx cupuliform, the limb minute, truncate or undulate; petals membranous, connate, deltoid, about 1.5 mm. long; styles connate into a carnose column, free at the apex, the locules and ovules 5. Fruits about 5–15 per head, sharply 5-angled, about 3 mm. in diameter, with a thick stylar column about 1.5 mm. long, the styles shortly free and spreading at the apex.

Costa Rica and Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, el. 6000 ft., *Davidson 329*. COCLÉ: region north of El Valle, alt. 1000 m., *Allen 3698*.

5. OREOPANAX Dec. & Planch.

OREOPANAX Dec. & Planch. in Rev. Hortic. ser. IV. 3:107. 1854.

Monopanax Regel, in Gartenflora 13:35. 1869.

Shrubs or trees, frequently scandent epiphytes when juvenile, sometimes epiphytic at maturity, glabrous or variously pubescent. Leaves simple or palmately compound, lobed or entire; petiole often dilated at the base but without a prominent extended ligule. Inflorescence with heads racemosely arranged in a terminal raceme or panicle, the peduncles swollen distally, the flowers sessile or essentially so, subtended by 2 or more bracteoles, the heads globose or ellipsoid, bracteolate. Flowers polygamo-dioecious (rarely polygamo-monoecious), (4–)5(–6)-merous; calyx cupuliform, the limb short, undulate, truncate or denticulate; petals usually submembranaceous, subacute at the apex, white or greenish, valvate; stamens inflexed in the bud, the anthers oblong, obtuse at both ends; styles in staminate flowers 1 or 2, slender, vestigial, in the pistillate flowers 2–10, free or slightly connate at the base, the ovary thick-walled, the locules as many as the styles. Fruit subglobose or ellipsoid, surmounted by the persistent calyx-limb, the styles often deciduous, the seeds as many as the locules or fewer by abortion.

a. Leaves palmately compound.......... 1. O. XALAPENSIS
aa. Leaves simple.
  b. Apex of leaves acuminate, cuspidate or acute.
    c. Leaves glabrous or essentially so.
      d. Basal lateral veins inconspicuous, the venation essentially pinnate, the blades 3–5 times as long as broad.......... 2. O. LIEBMANNI
      dd. Basal lateral veins of the leaf-blades in 1 or 2 pairs, conspicuous, ascending or spreading, the blades 1–2 (rarely 3) times as long as broad.......... 3. O. CAPITATUS
    cc. Leaves and young branches conspicuously stellate-tomentose.......... 4. O. VESTITUS
  bb. Apex of leaves rounded.......... 5. O. COSTARICENSIS

1. OREOPANAX XALAPENSIS (HBK.) Dec. & Planch. in Rev. Hortic. ser. IV. 3: 108. 1854.

Aralia xalapensis HBK. Nov. Gen. & Sp. 5:8. 1821.
Hedera xalapensis (HBK) DC. Prod. 4:264. 1830.
Aralia ghiesbrechtii A. Vershaffelt ex E. Morren, in Belg. Hortic. 13:3. 1863.
Aralia thibautii A. Vershaffelt ex E. Morren, loc. cit. 1863.
Monopanax ghiesbrachtii (A. Vershaffelt ex E. Morren) Regel, in Gartenflora 18:35. 1869.
Aralia mexicana hort. acc. to Lavallée, Arb. Segrez. 125. 1877, as syn.
Oreopanax thibautii (A. Vershaffelt ex E. Morren) Hook. f. in Bot. Mag. *pl. 6340*. 1878
Oreopanax xalapense var. *laxiflorum* Kuntze, Rev. Gen. 1:271. 1891.
Oreopanax xalapense var. *spiciforme* Kuntze, loc. cit. 1891.
Oreopanax taubertianum Donn. Sm. in Bot. Gaz. 19:4. 1894.
Oreopanax loesernerianus Harms, in Engl. Bot. Jahrb. 23:127. 1896.

Shrubs or trees to 10 m. tall, the branchlets terete, glabrous or sparsely to densely ferrugineous stellate-pubescent. Leaves palmately compound; leaflets 5–10 (rarely 3–12), the blades ovate- to obovate- or lanceolate-elliptic, 5–30 cm. long, 1.5–11.0 cm. broad, short-acuminate to long-caudate at the apex, attenuate at the base, glabrous above, glabrous or sparingly ferrugineous stellate-pubescent below, entire or serrate, the serrations remote, generally in the apical half of the lamina, the costa prominent below, the primary lateral veins spreading; petioles striate, glabrous or sparsely ferrugineous stellate-pubescent, 7–31 (–60) cm. long, dilated proximally, the petiolules striate, 0.5–3.5 (–25) cm. long. Inflorescences generally ferrugineous stellate-pubescent throughout, racemose or paniculate, the primary peduncle 1–3 cm. long, the primary rhachis 17–40 cm. long, the bracts ovate-oblong, often to 8 mm. long, the floriferous peduncles many, 0.5–2.0 (–4.0) cm. long, glabrous or pubescent. Staminate heads globose or slightly elongate, 5–13 mm. in diameter, the subtending bracts often connate; flowers 20–50 per head; calyx 1.0–1.5 mm. long, about 1 mm. in diameter, the limb essentially truncate; petals deltoid, 1.5–3.0 mm. long, 1.0–1.5 mm. broad; filaments 2–3 mm. long, the anthers about 1 mm. long, 0.5 mm. broad; style 1. Fruiting heads to 1.5 cm. in diameter, the fruits 2–12 (usually about 6) per head, coriaceous, ellipsoid or subglobose, at maturity 5–7 mm. in diameter, the persistent styles 5, recurved, the seeds frequently 4 or 5, sometimes fewer.

Mexico southward to western Panama, 800–3000 m. altitude. Known as *pava* in Panama.

CHIRIQUÍ: Bajo Chorro, Boquete District, elev. 6000 ft., *Davidson 165, 244*; vicinity of Casita Alta, Volcán de Chiriquí, ca. 1500–2000 m., *Woodson, Allen & Seibert 931*; Alto Lino, 990 m., *Bro. Maurice 750*; vicinity of Cerro Punta, alt. 2000 m., *Allen 1561*; Finca Lérida to Peña Blanca, alt. 1750–2000 m., *Woodson & Schery 329*.

One specimen, *Woodson & Schery 329*, has certain vegetative characteristics which would seem to ally it with O. *echinops* (Schlechtd. & Cham.) Dec. & Planch., i.e., the branchlets and petioles are densely ferrugineous stellate-tomentose; 3 to 7 leaflets, broadly elliptic, sessile. Unfortunately the inflorescence of the specimen is much too immature to make a positive determination.

2. OREOPANAX LIEBMANNI Marchal, in Bull. Acad. Belg. II. 47:87. 1879.

Aralia longifolia Sessé & Moç. Fl. Mex. 87. 1894.
Oreopanax microcephalum Donn. Sm. Enum. Pl. Guat. 6:71. 1903, *nomen nudum*.
Oreopanax meiocephalum Donn. Sm. in Bot. Gaz. 37:210. 1904.
Oreopanax oligocarpum Donn. Sm. loc. cit. 1904, as syn.

Trees to 20 m. tall, or epiphytic shrubs, the branchlets slender, stellate-pubescent soon becoming glabrescent. Leaves simple, narrowly elliptic, oblong, obovate or oblanceolate, 6–25 cm. long, 2–6 cm. broad, acuminate at the apex, attenuate to obtuse at the base, glabrous or essentially so, entire, the basal lateral veins inconspicuous, the venation essentially pinnate, the costa raised, the primary lateral veins 6–10 per side, arcuate-ascending; petioles to 15 cm. long, sometimes dilated proximally and distally. Inflorescences paniculate, stellate-pubescent, the primary peduncle 2–5 cm. long, the primary rhachis 5–10 cm. long, the bracts small, inconspicuous, the secondary peduncles 1.0–2.5 cm. long, the secondary rhachises 2–8 cm. long, the floriferous peduncles less than 1 cm. long. Staminate heads subglobose, 1.5–4.0 mm. in diameter, flowers 4–15 per head; calyx broadly cupuliform, 1 mm. long, the limb truncate or undulate; petals 5, oblong-deltoid, about 1.5 mm. long, 0.75 mm. broad at the base; filaments about 1.75 mm. long, the anthers 0.75 mm. long, 0.5 mm. broad; style 1. Bisexual flowers 2–5 per head; calyx, corolla and androecium resembling the staminate flowers; styles 5 (or up to 8), carnose, short. Fruits usually 2 or 3 (or up to 5) per head, ovoid, 3–5 mm. in diameter, surmounted by the persistent styles, the seeds 5 (to 8) or fewer.

Mexico southward to western Panama.

BOCAS DEL TORO: Robalo Trail, northern slopes of Cerro Horqueta, alt. 6000–7000 ft., *Allen 4925*. CHIRIQUÍ: humid forest around Los Siguas Camp, southern slope of Cerro de la Horqueta, altitude about 1700 m., *Pittier 3184*; valley of the upper Río Chiriquí Viejo, *White & White 961*; Bajo Chorro, Boquete District, el. 6000 ft., *Davidson 279*.

3. OREOPANAX CAPITATUS (Jacq.) Dec. & Planch. in Rev. Hortic. ser. IV. 3:108. 1854.

Aralia capitata Jacq. Enum. Pl. Carib. 18. 1760.
Hedera capitata (Jacq.) J. E. Smith, Ic. Pict. *pl. 4*. 1790.
Hedera frondosa Salisb. Prodr. 144. 1796.
Botryodendrum capitatum (Jacq.) Endl. ex Heynh. Nom. 2:75. 1846.
Sciadophyllum capitatum (Jacq.) Griseb. Fl. Brit. W. Ind. 306. 1860.
Oreopanax destructor Seem. in Journ. Bot. 7:351. 1869.
Aralia ovata Sessé & Moç. Fl. Mex. 86. 1894.

Trees to 15 m. tall, sometimes epiphytic when young, glabrous throughout except for the inflorescence, the branchlets stout, terete, rugose. Leaves simple, ovate, elliptic, lanceolate or obovate, 10–35 cm. long, 4–25 cm. broad, acute or acuminate at the apex, cuneate to subcordate at the base, entire, the basal lateral veins in 1 or 2 pairs, conspicuous; petioles to 30 cm. long. Inflorescence paniculate, stellate-puberulent or glabrous, the primary peduncle plus rhachis 6–20 (–30) cm. long, the bracts inconspicuous, the secondary peduncles and rhachises 4–12 cm. long, the floriferous peduncles 0.5–2.0 cm. long. Staminate heads globose or slightly elongate, flowers 10–25 per head, the bracteoles deltoid or ovate; calyx about 1 mm. long, the limb undulate; petals 5, oblong, 2.0–2.5 mm. long, about 1 mm. broad; filaments about 4 mm. long, anthers about 1.25 mm. long, 0.75 mm. broad; styles 1 or 2. Bisexual heads 5- to 12-flowered; calyx, corolla and androecium resembling the staminate flowers; styles 5–10; fruit subglobose, 5–8 mm. in diameter, the styles recurved, deciduous, the seeds usually few.

Mexico to Cuba and Santo Domingo, and southward; also in South America. A common species to 1700 m. altitude.

BOCAS DEL TORO: Water Valley, vicinity of Chiriquí Lagoon, *Von Wedel 2669*. CANAL ZONE: Barro Colorado Island, *Wetmore & Abbe 247, 248, Aviles 107, 996, Woodson & Schery 980*. CHIRIQUÍ: Volcán de Chiriquí, Boquete District, el. 8500 ft., *Davidson 970*, el. 6000 ft., *Davidson 174, 249, 718*; vicinity of Cerro Punta, alt. 2000 m., *Allen 1574*; vicinity of Boquete, lumber road into the hills east of the Río Caldera, alt. 4500–6500 ft., *Allen 4655*.

4. OREOPANAX VESTITUS A. C. Smith, in Ann. Mo. Bot. Gard. 27:324. 1940.

Trees, shrubs or scramblers to 15 m. tall, more or less densely ferrugineous stellate-tomentose throughout, the hairs sessile or with short slender stalks, the branchlets slender. Leaves simple, elliptic or elliptic-oblong, 9–20 cm. long, 3–7 cm. broad, acuminate at the apex, broadly cuneate to rounded at the base, entire, 3-veined from the base, the costa prominent, the primary lateral veins few; petioles

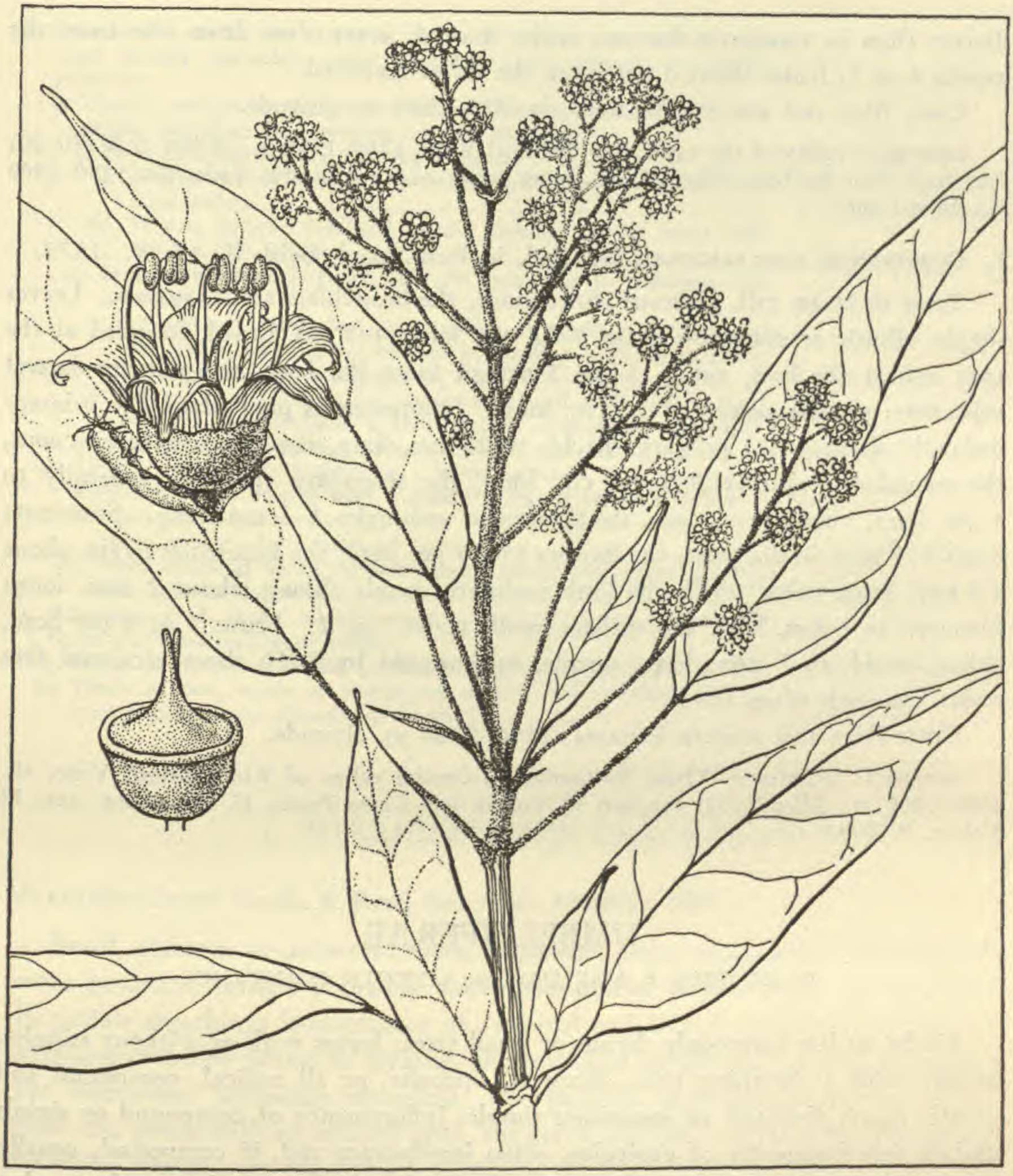

Fig. 104. *Oreopanax vestitus*

to 10 cm. long. Inflorescence paniculate, the primary peduncle to 1 cm. long, the primary rhachis 8–10 cm. long, the bracts linear oblong, 1–2 mm. long, the secondary peduncles 0.5–2.0 cm. long, the secondary rhachises 1–5 cm. long, the floriferous peduncles less than 1 cm. long. Staminate heads subglobose, 3–5 mm. in diameter, bracteoles minute, flowers 8–15 per head; calyx 1 mm. long, 1.0–1.5 mm. in diameter, the limb truncate; petals 4 or 5, free, ovate-deltoid, 1.25–1.75 mm. long, about 0.75 mm. broad; filaments 2.5–3.5 mm. long, the anthers approximately 1 mm. long, 0.5 mm. broad; styles 1 or 2, about 0.5 mm. long, spreading. Bisexual flowers 5–9 per head; calyx 1.25–1.75 mm. in diameter; petals subconnate and calyptrate, about 1 mm. long, 1 mm. broad; filaments much shorter than in staminate flowers; styles 4 or 5, erect, free from the base, the locules 4 or 5; fruits about 6 per head, the styles recurved.

Costa Rica and western Panama, alt. 975–2000 m. altitude.

CHIRIQUÍ: valley of the upper Río Chiriquí Viejo, 1300–1900 m., *White & White 40*; trail from Paso Ancho to Monte Lirio, upper valley of Río Chiriquí Viejo, alt. 1500–2000 m., *Allen 1504*.

5. OREOPANAX COSTARICENSIS Marchal, in Bull. Acad. Belg. II. 47:89. 1879.

Trees to 20 m. tall, glabrous throughout, the branchlets stout, rugose. Leaves simple, elliptic or obovate-elliptic, 9–17 cm. long, 4–8 cm. broad, rounded at the apex and at the base, entire, 3- to 5-nerved from the base, the primary lateral veins few; petioles slender, 4–18 cm. long. Inflorescences paniculate, the primary peduncle obsolete, the primary rhachis to 25 cm. long, the bracts inconspicuous, the secondary peduncles 0.5–2.0 cm. long, the secondary rhachises generally to 4 cm. long, sometimes longer, the floriferous peduncles 1–3 cm. long. Staminate heads 5–7 mm. in diameter, the flowers 12–15 per head, the bracteoles ovate, about 1.5 mm. long; calyx small, the limb undulate; petals oblong, about 2 mm. long; filaments to 2 mm. long, the anthers small; styles 1 or 2. Fruits 3 or 4 per head, oblong-ovoid, to 7 mm. long, purple, surmounted by 8–10 short recurved free styles, the seeds often fewer.

Costa Rica and western Panama, 1500–2700 m. altitude.

CHIRIQUÍ: vicinity of "New Switzerland", central valley of Río Chiriquí Viejo, alt. 1800–2000 m., *Allen 1395*; bewteen El Volcán and Cerro Punta, G. *White 24*; near El Volcán, P. *White 171*.

UMBELLIFERAE

BY MILDRED E. MATHIAS AND LINCOLN CONSTANCE

Herbs, or less commonly shrubs or small trees; leaves with or without stipules, usually with a sheathing base, alternate, opposite, or all radical, compound and usually much dissected, or sometimes simple; inflorescence of compound or simple umbels, less frequently of capitulae, often involucrate and, if compound, usually also involucellate; flowers perfect or unisexual, predominantly regular; calyx adnate to the ovary, its 5 lobes prominent and persistent in fruit, to obsolete; alternating with 5 free petals, these usually with an inflexed tip; stamens 5, alternating with the petals; ovary inferior, consisting of 2 uniovulate carpels; styles 2, often swollen at base to form a stylopodium; fruit a schizocarp, the 2 carpels united by their faces (commissure) and commonly separating at maturity, usually suspended from the apex of an axial projection (carpophore), terete or compressed or flattened either laterally or dorsally, normally 5-ribbed, the pericarp usually provided with evident vittae, or oil passages.

A cosmopolitan family, but best represented in the temperate zones and only weakly developed in the tropics. Panama has fewer species than the countries either to the north or the south. Additional adventive species of the family are to be expected in Panama.

a. Inflorescence of distinct simple or compound umbels with distinct rays (and usually pedicels), never capitate; fruits smooth or merely pubescent.
b. Umbels compound (or some umbels simple); leaves estipulate, the petiole sheathing; fruit without a woody endocarp.
c. Fruit flattened dorsally, the ribs winged.
d. Flowers white; involucel present; small trees or shrubs with large leaflets.. 1. MYRRHIDENDRON
dd. Flowers yellow; involucel usually lacking; annual herbs with filiform leaf-divisions.. 3. ANETHUM
cc. Fruits compressed laterally, the ribs prominent to indistinct, but not winged.
e. Inflorescence puberulent; our species a woody-based perennial with large leaflets, a conspicuous involucel, a parted carpophore, and large oblong to oblong-oval fruit.. 2. ARRACACIA
ee. Inflorescence glabrous; our species an annual with filiform leaf-divisions, no involucel, a shortly cleft carpophore, and small, short-pedicellate, ovoid fruit.. 4. APIUM
bb. Umbels simple (or proliferous); leaves stipulate, the petiole not sheathing; fruit usually with a woody endocarp (or this obsolete).
f. Stems erect; leaves opposite; petals with an inflexed apex; carpophore present; fruit flattened dorsally.. 7. SPANANTHE
ff. Stems creeping; leaves alternate; petals plane; carpophore lacking; fruit flattened laterally.. 8. HYDROCOTYLE
aa. Inflorescence of heads, without rays or pedicels, never of umbels; fruits scaly, tuberculate, or bristly.
g. Heads of numerous, sessile, perfect flowers; plants spinescent.. 6. ERYNGIUM
gg. Heads of few, sessile or pedicellate, perfect and staminate flowers intermixed; plants scarcely spinescent.. 5. SANICULA

1. MYRRHIDENDRON Coult. & Rose

MYRRHIDENDRON Coult. & Rose, Bot. Gaz. 19:466. 1894.

Small, glabrous or pubescent trees, or shrubs; stems stout, erect, branched, the leaves petiolate, ternate-pinnately decompound, the leaflets acute or acuminate, the petiole sheathing; inflorescence of terminal and lateral compound umbels, the involucre of a few bracts or lacking, the involucel of few to numerous bractlets; rays numerous, spreading-ascending, the pedicels spreading-ascending; flowers white, the petals with an inflexed apex, the calyx obsolete; stylopodium low-conical, the styles slender, the carpophore parted to the base; fruit flattened dorsally, the dorsal ribs narrowly winged, the lateral broader, the vittae solitary in the intervals, 2 or 3 on the commissure; seed flattened dorsally, sulcate beneath the intervals, its face flat.

Myrrhidendron is one of the most remarkable and interesting genera of Umbelliferae because of its arborescent habit, a clear refutation of the usual dictum that the family, in contrast to the Araliaceae, is "herbaceous." The four species known occupy a collective area extending from Costa Rica to Ecuador. Coulter and Rose executed a monograph of the genus in 1927 (Jour. Wash. Acad. 17:213–215), and an exhaustive anatomical comparison by R. L. Rodríguez C. of the species of *Myrrhidendron* with each other, with other "woody" Umbelliferae, and with representative Araliaceae, was published in Univ. Calif. Publ. Bot. 29: 145–318 1957.

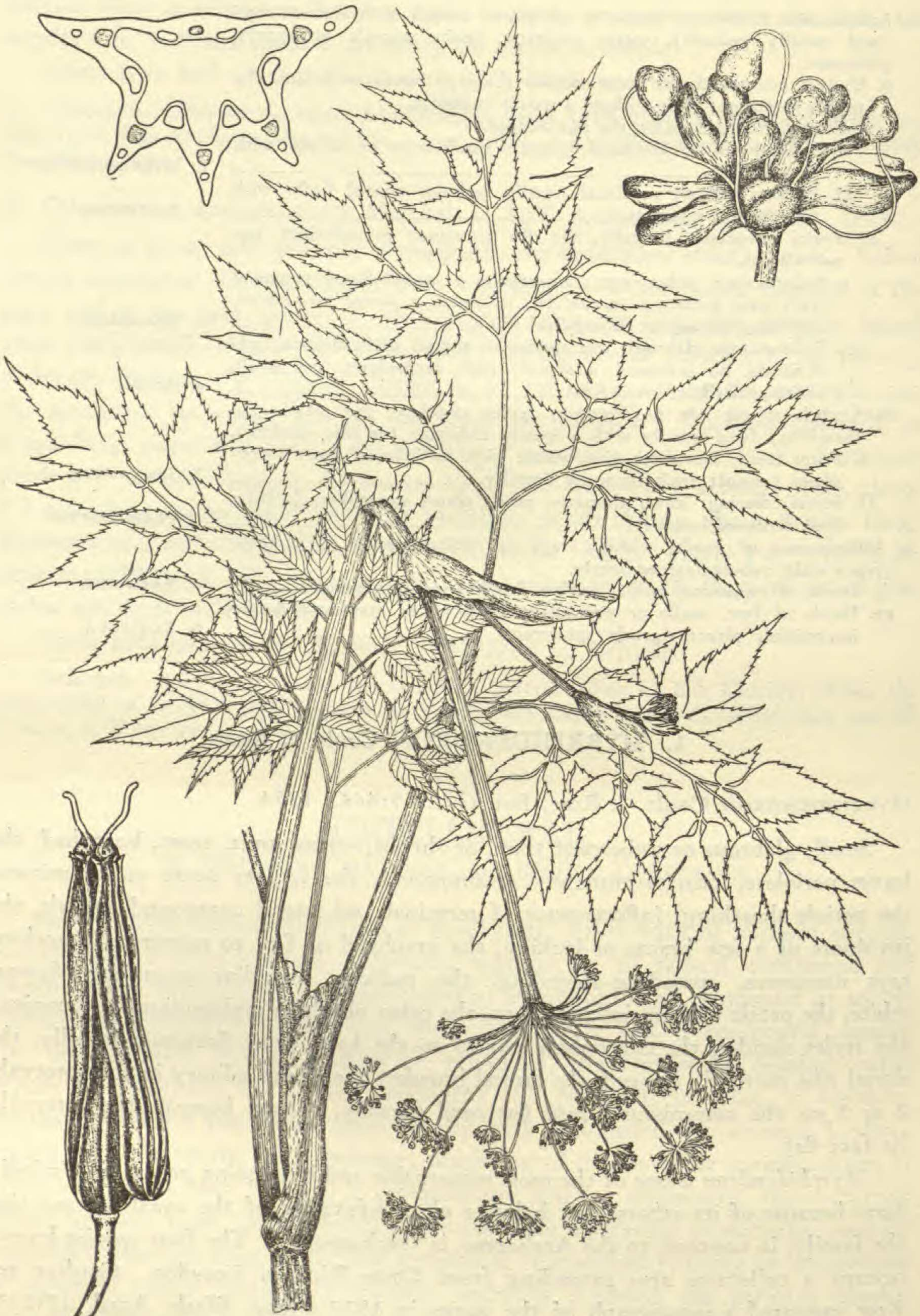

Fig. 105. *Myrrhidendron maxonii*

1. MYRRHIDENDRON MAXONII Coult. & Rose, Jour. Wash. Acad. 17:214. 1927.

Small, glabrous and glaucous tree ("woody herb") 2–4 m. tall from a stout taproot; leaves ovate-deltoid, the blade 3–4 dm. long, the leaflets lanceolate, 2–6 cm. long, spinulose-serrate and laciniately lobed, paler beneath, the petiolules with a membranaceous stipular ring, the petiole with a conspicuous, inflated sheath; cauline leaves reduced upward, sometimes bladeless; peduncles 3–8 cm. long, glandular-puberulent above; involucre of 1–3 linear bracts to 2.5 cm. long, the involucel of several entire to cleft bractlets 5–10 mm. long and exceeding the flowers; fruiting rays unequal, 3–6 cm. long, glandular-puberulent on the angles, the pedicels 7–9 mm. long, glandular-puberulent; fruit linear, 15–20 mm. long.

CHIRIQUÍ: Cuesta Grande, eastern slope of Chiriquí Volcano, 2600–2990 m., *Maxon 5311*; El Potrero Camp, Chiriquí Volcano, 2800–3000 m., *Pittier 3099*; Potrero Muleto to summit, Volcán de Chiriquí, 3500–4000 m., *Woodson & Schery 410*; Valley of the upper Río Chiriquí Viejo, *Peggy White 57;* Volcán de Chiriquí, Boquete District, 10,000 feet, *Davidson 983*; summit and SW face of Cerro Copete, 9000 feet, *Allen 4902*.

This species is known only from Volcán de Chiriquí and Cerro Copete, at elevations of 2600–4000 meters.

2. ARRACACIA Bancroft

ARRACACIA Bancroft, Trans. Agr. Hort. Soc. Jamaica 1825:3. 1825.

Pentacrypta Lehm. Ind. Sem. Hort. Hamburg 16. 1828.

Perennial, glabrous or pubescent herbs from taproots or tubers; stems erect, branched or simple, the leaves petiolate, once or more ternate, pinnate, or ternate-pinnate, the petiole sheathing; inflorescence of terminal and lateral compound umbels, the fertile rays few to numerous, an involucre usually lacking, an involucel commonly present; flowers white to purple or greenish or greenish-yellow, the petals with an inflexed apex, the calyx obsolete; stylopodium conical to indistinct, the styles long or short, the carpophore parted to the base or merely bifid; fruit compressed laterally, usually narrowed at apex, all ribs prominent, acute or obtuse, or filiform and indistinct, the vittae solitary to several in the intervals, 2 or several on the commissure; seed subterete, often sulcate beneath the vittae, its face sulcate or concave.

Arracacia, with some 33 species in the warmer parts of North and South America, is represented in Panama by a single species.

1. ARRACACIA ATROPURPUREA (Lehm.) Benth. & Hook.; Hemsl. Biol. Centr. Amer. Bot. 1:564. 1880.

Pentacrypta atropurpurea Lehm. Ind. Sem. Hort. Hamburg 17. 1828.
Arracacia irazuensis Kuntze, Rev. Gen. 1:265. 1891.
Arracacia Luxeana Coult. & Rose, Bot. Gaz. 18:55. 1893.
Arracacia humilis Rose, Contr. U. S. Nat. Herb. 8:336. 1905.

Slender, woody-based herb 6–40 dm. tall, glabrous except for the puberulent inflorescence; leaves oblong-ovate to ovate-deltoid, the blade 8–20 cm. long, 2–3-ternate, the leaflets oblong-ovate, 2–8 cm. long, 1–3.5 cm. broad, doubly serrate and often incised, the petiole 8–16 cm. long; cauline leaves reduced upward; peduncles slender, 1–3 dm. long; involucre usually wanting, the involucel of several conspicuous bractlets exceeding the flowers and often the fruit; fertile rays usually 3–8, unequal, spreading, 3–9 cm. long, the fertile pedicels 5–10, 3–12 mm. long; flowers purple or greenish-yellow; stylopodium low-conical, the carpophore parted; fruit oblong to oblong-oval, 4–7 mm. long, 2–4 mm. broad, the ribs acute.

CHIRIQUÍ: savannas, Boquete, Boquete District, 4000 feet, *Davidson 772;* El Boquete, 1000–1300 m., *Pittier 2952*; Potrero Muleto to summit, Volcán Chiriquí, 3500–4000 m., *Woodson & Schery 402*; Loma Larga to summit, Volcán de Chiriquí, 2500–3380 m., *Woodson, Allen & Seibert 1056.*

This highly variable, suffrutescent herb, extending well northward into Mexico, presumably reaches its southern limit in the highlands of Panama at elevations of 1000 to 4000 meters.

3. ANETHUM L.

Anethum L. Sp. Pl. 263. 1753.

Strongly anise-scented, glabrous and glaucous annual herbs; stems erect, branched, the leaves petiolate, pinnately decompound, the petiole sheathing; inflorescence of terminal and lateral compound umbels, an involucre and involucel usually lacking; flowers yellow, the petals with an inflexed apex, the calyx obsolete; stylopodium conical; the styles short, reflexed, the carpophore parted to the base; fruit flattened dorsally, all ribs narrowly winged, the lateral broader than the dorsal, the vittae solitary in the intervals, 2–4 on the commissure; seed flattened dorsally, its face flat or slightly concave.

1. Anethum graveolens L. Sp. Pl. 263. 1753.

Annual herb 4–17 dm. tall; leaves oblong to obovate, the blade 13–35 cm. long, 11–20 cm. broad, pinnately decompound, the ultimate divisions filiform, 4–20 mm. long, the petiole 5–6 cm. long; upper cauline leaves greatly reduced; peduncles 7–16 cm. long; rays 10–45, spreading, 3–10 cm. long, the pedicels 20–50, 6–10 mm. long; fruit ovoid, about 4 mm. long, 2 mm. broad.

BOCAS DEL TORO: slopes of "Cerro Horqueta," 4400 feet, cultivated, *Bro. Maurice 857.*

Anisillo (dill), a European plant adventive throughout the warmer parts of North America, may be expected to be a successful escape in Panama.

4. APIUM L.

Apium L. Sp. Pl. 264. 1753.

Ciclospermum Lag. Amen. Nat. 101. 1821

Annual, biennial, or perennial glabrous herbs from taproots or creeping rootstocks; stems erect to prostrate, usually branched, the leaves petiolate, pinnate to ternate-pinnately decompound, the petiole sheathing; inflorescence of compound (or frequently some simple) umbels with or without an involucre and involucel; flowers white or greenish, the petals with an inflexed apex, the calyx minute or obsolete; stylopodium short-conical to depressed, the styles short, the carpophore entire, bifid, or 2-cleft; fruit compressed laterally and constricted at the commissure, the ribs filiform, prominent, obtuse, the vittae solitary in the intervals, 2 on the commissure; seed subterete, its face flat.

This is a very large genus with an essentially cosmopolitan distribution. However, the genus is characterized largely in negative terms, and the intergeneric boundaries and the homogeneity of the group as last monographed by Wolff in 1927 (Das Pflanzenreich 90 [IV. 228]:26–58) leave many problem unresolved.

1. APIUM LEPTOPHYLLUM (Pers.) F. Muell.; Benth. & Muell. Fl. Austr. 3:372. 1866.

Sison Ammi Jacq. Hort. Vindob. 2:95. 1773. Not. L. 1753.
Pimpinella leptophylla Pers. Syn. Pl. 1:324. 1805.
Helosciadium leptophyllum DC. Mém. Soc. Phys. Nat. Hist. Genève 4:493. 1829.
Apium Ammi Urban in Mart. Fl. Bras. 11^1:341. 1879.
Apium Ammi var. *leptophyllum* Chodat & Wilczek, Bull. Herb. Boiss. II. 2:526. 1902.
Helosciadium Ammi Britton, Fl. Bermuda 279. 1918.
Cyclospermum leptophyllum Sprague, Jour. Bot. 61:131. 1923.

Annual herb 0.5–6 dm. tall, alternately branched above; leaves oblong-ovate, the blade 3.5–10 cm. long, 3.5–8 cm. broad, 3–4-pinnately decompound, the ultimate divisions filiform, 1.5–7 mm. long, the petiole 2.5–11 cm. long; umbels compound or some simple, pedunculate or sessile, the peduncles to 2 cm. long; involucre and involucel lacking; rays 3–5, 1–2.2 cm. long, the pedicels 2–8 mm. long; carpophore shortly 2-cleft; fruit ovoid, 1.2–3 mm. long, 1.5–2 mm. broad.

CHIRIQUÍ: Valley of the upper Río Chiriquí Viejo, *Peggy White 30.*

This species, originally described from the West Indies, is native to the warmer parts of the western hemisphere and has become adventive pantropically.

5. SANICULA L.

SANICULA L. Sp. Pl. 235. 1753.

Perennial or biennial, glabrous, or pubescent herbs from taproots, rootstocks, tubers, or fascicled roots; stems (sometimes obsolete) erect to rarely decumbent, simple or branched, the leaves petiolate, lobed or divided to decompound, rarely entire, the petiole sheathing; inflorescence of cymosely, umbellately, or paniculately arranged small heads subtended by a foliaceous involucre, the flowers perfect and staminate, white, yellow, or purple, the petals with an inflexed apex, the calyx very prominent and persistent; stylopodium lacking, the styles short to elongate, a carpophore lacking; fruit somewhat compressed laterally and densely tuberculate, scaly, or bristly, sessile or stipitate, the ribs obsolete, the vittae irregularly arranged, prominent to obscure; seed subterete or flattened dorsally, often sulcate beneath the vittae, its face flat to concave or sulcate.

Sanicula, another of the most distinctive genera of the family, consists of some 40 species distributed in a semi-cosmopolitan pattern, but concentrated in the temperate zones. The genus was monographed by Wolff in 1913 (Das Pflanzenreich 61 [IV. 228]:1–305) and by Shan and Constance in 1951 (Univ. Calif. Publ. Bot. 25:1–78). The interpretation of the inflorescence as consisting of capitulae (condensed simple umbels) or heads instead of "irregularly compound umbels"—the more usual view—is taken from the discriminating essay on, "The Umbelliferae of North Carolina and their distribution in the southeast" (Jour. Elisha Mitchell Sci. Soc. 66:195–266. 1950) by Charles L. Rodgers. The earlier treatment of the family by Mathias and Constance in NORTH AMERICAN FLORA separated the genera *Sanicula* and *Eryngium* widely. We now firmly believe this to have been a mistake. In returning the genera to closer juxtaposition, it is helpful to interpret their characteristics in comparable terms.

1. SANICULA LIBERTA Cham. & Schlecht. Linnaea 1:353. 1826.

Sanicula mexicana DC. Prodr. 4:84. 1830.

Perennial herb from a fleshy rhizome, glabrous, the stem usually solitary, 2–6 dm. tall, dichasially branched; leaves broadly cordate-orbicular to suborbicular, the blade 2.5–8 cm. long, 3.5–10 cm. broad, palmately 5-parted, the primary leaflets petiolulate, setose-crenate and incised, the petiole 5–23 cm. long; cauline leaves reduced upward; peduncles 5–45 mm. long, sterile and fertile flowers intermixed, the former pedicellate; flowers pale green, the calyx-teeth narrowly lanceolate, acuminate; styles longer than the fruit-prickles; fruit usually 2 or 3 in each head, subglobose, 2–4 mm. long, 2–4 mm. broad, stipitate, densely uncinate-bristly, the vittae small, several on the dorsal and lateral surfaces, 2 on the commissure; seed flattened dorsally, its face flat.

CHIRIQUÍ: Bajo Chorro, Boquete District, 6000 feet, *Davidson 716*; vicinity of El Boquete, 1000–1300 m., *Maxon 5007*; Caldera River below Quiel, forests around El Boquete, 1000–1300 m., *Pittier 3148*; foot of Pianista, vicinity of El Boquete, 1350 m., *Bro. Maurice 708*; vicinity of Casita Alta, Volcán de Chiriquí, 1500–2000 m., *Woodson, Allen & Seibert 963*; vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, 1800–2000 m., *Allen 1353*; Valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, 1300–1900 m., *Seibert 294*; llanos on slopes of Volcán de Chiriquí Viejo and along Río Chiriquí Viejo, 1200 m., *Allen 965*.

A plant of the forests and forest clearings, at altitudes of 1000–2000 meters in Panama, it extends from Chihuahua, Mexico, to Córdoba, Argentina.

6. ERYNGIUM L.

ERYNGIUM L. Sp. Pl. 232. 1753.

Biennial or perennial, usually glabrous herbs (our species) from stout taproots or rootstocks; stems (when present) prostrate to erect, simple or branched, the leaves mostly petiolate, entire to lobed or divided, usually spinose, the petiole sheathing; inflorescence of solitary to numerous involucrate heads, the flowers all perfect, white, blue, or purple, each subtended by an involucel (floral) bractlet, the petals with an inflexed, lobed to fimbriate apex, the calyx prominent, often spinescent; stylopodium lacking, the styles shorter than to exceeding the calyx, a carpophore lacking; fruit subterete, scaly or tuberculate, the ribs obsolete, the

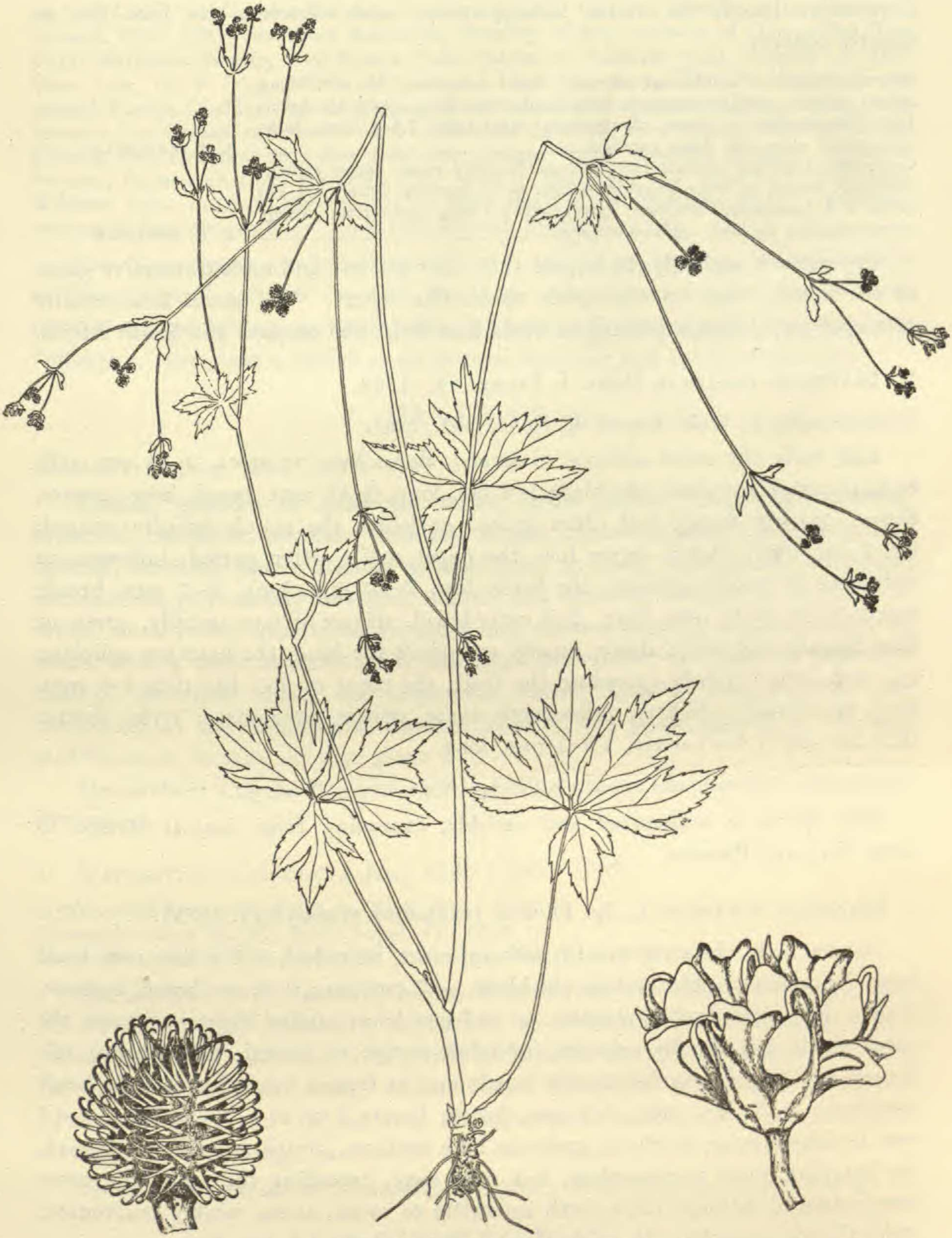

Fig. 106. *Sanicula liberta*

commissure broad, the vittae inconspicuous; seed subterete, its face flat or slightly concave.

Short-caulescent or acaulescent perennial from a taproot; leaves without callous margins, coarsely spinose-serrate; heads violet-blue, ovoid, the bracts 8–10, oblanceolate to ovate, chartaceous; calyx-teeth 1.5–2 mm. long; fruit-angles scaly, the faces papillose	1. E. CARLINAE
Caulescent, branched biennial from fibrous, fascicled roots; leaves callous-margined, crenate to finely spinulose-serrate; heads greenish, cylindrical, the bracts 5–6, lanceolate, foliaceous; calyx-teeth 0.5 mm. long; fruit densely tawny-papillose on both angles and faces	2. E. FOETIDUM

Eryngium is probably the largest (200–250 species) and most distinctive genus of the family, with its commonly thistle-like aspect. The genus is essentially cosmopolitan, although tending to avoid East Asia, and tropical and South Africa.

1. ERYNGIUM CARLINAE Delar. f. Eryng. 53. 1808.

Eryngium affine H. Wolff, Repert. Sp. Nov. 7:345. 1909.

Low herb, the stems solitary to several, decumbent to erect, 0–25 cm. tall; basal leaves oblanceolate, the blade 3–8 cm. long, 5–18 mm. broad, long-cuneate, obtuse, coarsely serrate and often incised or lobed, the petiole broadly winged, 0.5–2 cm. long; cauline leaves few, the upper sessile, often parted; inflorescence trifurcate or weakly cymose, the heads few, 7–10 mm. long, 5–7 mm. broad; bracts 8–10, 8–20 mm. long, 2–6 mm. broad, spinose-serrate apically, green or blue beneath and white above, usually exceeding the head, the bractlets subulate, 2–3 mm. long, slightly exceeding the fruit, the coma of 1–3 bractlets 2–5 mm. long, occasionally obsolete; calyx-teeth ovate, obtuse, mucronate; styles shorter than the calyx; fruit ovoid, 1.5–2 mm. long.

CHIRIQUÍ: Valley of the upper Rio Chiriquí Viejo, *Peggy White 52*.

This species is widespread and variable, extending from central Mexico to Costa Rica and Panama.

2. ERYNGIUM FOETIDUM L. Sp. Pl. 232 (excluding synonymy). 1753.

Slender herb, the stem usually solitary, erect, branched, 0.5–6 dm. tall; basal leaves lanceolate or oblanceolate, the blade 3–27 cm. long, 1–5 cm. broad, cuneate, obtuse, the petiole short or obsolete, up to 3 cm. long; cauline leaves numerous, the upper sessile and usually opposite, spinulose-serrate to parted; inflorescence trifurcate, the lateral branches usually continuing to form a monochasium, the heads numerous, 7–11 mm. long, 3–5 mm. broad; bracts 5 or 6, 1–4 cm. long, 2–10 mm. broad, entire or nearly so, green on both surfaces, greatly exceeding the head, the bractlets linear to lanceolate, 2–3 mm. long, exceeding the fruit, the coma conspicuous or lacking; calyx-teeth lanceolate to ovate, acute, weakly mucronate; styles slightly exceeding the calyx; fruit globose, about 1.5 mm. long.

"Isthmus of Panamá," 6 April 1882, *J. Ball*. BOCAS DEL TORO: *von Wedel 406*; Island Potrero, Changuinola Valley, *Dunlap 207*; Water Valley, vicinity of Chiriquí Lagoon, *von Wedel 1644*. CANAL ZONE: Ahorca Lagarto to Culebra, *Cowell 371*; Hospital Grounds at Ancón, 20–80 m., *Pittier 3959*; Barro Colorado Island, *L. H. & Ethel Z. Bailey 499, Shattuck 132, Starry 189, Kenoyer 487;* Las Cascadas Plantation, *Standley*

29,546; Cerro Gordo, near Culebra, *Standley 25,981*; Chagres, *Fendler 133*; vicinity of Corozal, *Piper 5305*; near Fort Randolph, *Standley 28,674*; vicinity of Gatuncillo, *Piper 5645*; Margarita Swamp, S of France Field, *Maxon & Valentine 7053*; vicinity of Miraflores Lake, *G. & Peggy White 189*; Mount Hope Cemetery, *Standley 28,773*; forests around Puerto Obaldía, San Blas coast, 0–50 m., *Pittier 4364*; Mandingo Valley, hills between Río Grande and Pedro Vidal on road to Arraiján, 50–150 m., *Pittier 2712*; Las Sabanas, *Bro. Celestine 107, Bro. Paul 140*; Taboga Island, *Standley 27,929*. CHIRIQUÍ: Boquete, Boquete District, *Davidson 570*. COCLÉ: Penonomé and vicinity, 50–1000 feet, *Williams 191*. COLÓN: between France Field and Catival, *Standley 30,258*. PANAMÁ: vicinity of Juan Franco Race Track, near Panamá, *Standley 27,749*.

This is a common species in tropical North and South America, and is adventive in more tropical areas of the Old World as well. Variously described as "aromatic," or as having an odor that is "strong," "peculiar," "nauseous," or "offensive," the plant is prized as an internal medicine and for flavoring food.

7. SPANANTHE Jacq.

SPANANTHE Jacq. Coll. 3:247. 1789.

Annual, glabrous to pubescent herbs; stems slender, erect, dichotomously branched, the leaves opposite, petiolate, simple, crenate-dentate, the petiole with lacerate, scarious, adnate stipules setulose-hairy at apex; inflorescence of simple, pedunculate, paniculately arranged, axillary and terminal umbels, the involucre of several small bracts; rays spreading-ascending; flowers white or greenish-white, the petals with a short inflexed apex, the calyx prominent; stylopodium depressed-conical, the styles short, the carpophore entire; fruit flattened dorsally and constricted at the commissure, the ribs filiform, the vittae minute or wanting; seed flattened dorsally, its face plane.

Spananthe is a distinctive monotypic genus of the warmer parts of the western hemisphere.

1. SPANANTHE PANICULATA Jacq. Coll. 3:247. 1789.

Hydrocotyle Spananthe Willd. Sp. Pl. 1:1363. 1798.
Spananthe setosa Moench. Meth. Suppl. 34. 1802.
Spananthe angulosa Turcz. Bull. Soc. Nat. Mosc. 20^1:171. 1847.

Annual herb 2–15 dm. tall; leaves deltoid-ovate, the blade 1.5–14 cm. long, 0.5–14 cm. broad, acuminate, subcordate to truncate, dentate-crenate, setose-pubescent on the veins and with a tuft of hairs at junction of petiole and blade, the petiole 0.7–15 cm. long; cauline leaves becoming narrower and subsessile upward; peduncles 0.7–14 cm. long, hirtellous-pubescent beneath the umbel; rays several, 7–10 mm. long; fruit ovoid, 2–4 mm. long, about 2 mm. broad.

CANAL ZONE: vicinity of Gatuncillo, *Piper 5651*; Barro Colorado Island, *Aviles 18*.

8. HYDROCOTYLE L.

HYDROCOTYLE L. Sp. Pl. 234. 1753.

Perennial, glabrous or pubescent creeping herbs; stems rooting at the nodes, the leaves petiolate, peltate or not, simple, entire to parted, the petiole not sheathing, stipulate; inflorescence of simple, or proliferous, umbels borne on axillary peduncles, or subsessile, an involucre present or lacking; rays spreading to reflexed; flowers white, greenish, or yellow, the petals plane, the calyx minute or obsolete; stylopodium conical to depressed, the styles short to elongate, a carpophore lacking; fruit strongly flattened laterally, the dorsal ribs acute or obsolete, the lateral usually conspicuous, the carpels orbicular to triangular in transection, oil-bearing cells conspicuous to obsolete, and strengthening cells usually surrounding the seed cavity, or these obsolete; seed ovate to ovate-oblong in transection, its face plane to concave.

Leaves orbicular-reniform, non-peltate.
  Plants pubescent; umbels 25–70-flowered; fruit-ribs evident.................. 1. H. MEXICANA
  Plants glabrous; umbels 5–10-flowered; fruit-ribs obsolete...................... 2. H. RANUNCULOIDES
Leaves orbicular, peltate.
  Fruit sessile; plants pubescent; umbels 2–6-flowered.................................... 3. H. PUSILLA
  Fruit pedicellate; plants glabrous; umbels many-flowered.
    Umbels simple; fruit-ribs obtuse... 4. H. UMBELLATA
    Umbels proliferous and hence irregularly compound; fruit-ribs acute. 5. H. BONARIENSIS

Hydrocotyle is a large, distinctive genus of perhaps 100 species, usually easily recognizable by its creeping stems, rounded leaves, simple umbels, laterally flattened fruits, and its preference for moist or wet habitats. It is primarily a genus of the southern hemisphere, but extends well into and across the tropics in both the New and Old Worlds. Its ability to thrive under tropical conditions, uncharacteristic of the Umbelliferae in general, permits it to be the largest of the family in Panama, with 5 species thus far reported and others to be expected.

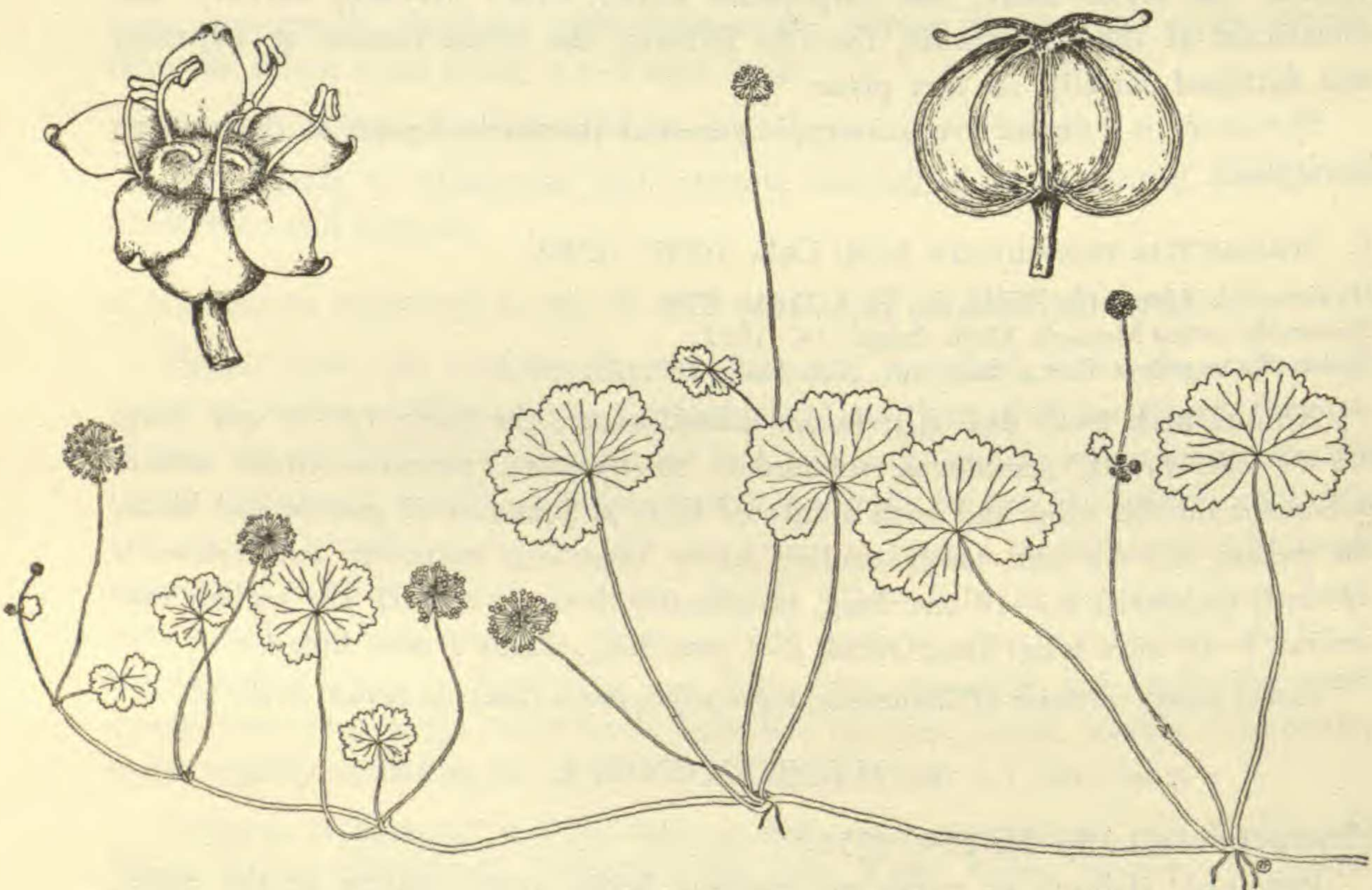

Fig. 107. *Hydrocotyle mexicana*

1. HYDROCOTYLE MEXICANA Schlecht. & Cham. Linnaea 5:208. 1830.

Stems slender; leaves 8–90 mm. in diameter, 7–11-lobed, the lobes crenate, appressed-strigose on the veins, the petiole 1–23 cm. long, hirsute above; peduncles hirsute, longer than the leaves; rays glabrous, 1–7 mm. long; fruit suborbicular, 1–1.5 mm. long and broad, the ribs acute.

BOCAS DEL TORO: Robalo Trail, northern slopes of Cerro Horqueta, 6000–7000 feet, *Allen 4969*. CHIRIQUÍ: upper Caldera watershed above El Boquete, 1650–1925 m., *Maxon 5644*; vicinity of Casita Alta, Volcán de Chiriquí, 1500–2000 m., *Woodson, Allen & Seibert 854*; Jaramillo, Boquete District, 5000 feet, *Terry 1285*; vicinity of "New Switzerland," central valley of Río Chiriquí Viejo, 1800–2000 m., *Allen 1373*; Río Chiriquí Viejo valley, near El Volcán, *Peggy White 182*; valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, 1300–1900 m., *Seibert 161*; on way up "cerro Pianista" (S. del Boquete), 4400 feet, *Bro. Maurice 853*. DARIEN: Cana, 2000 feet, *Williams 783*.

This species is an inhabitant of humid forests, in Panama at altitudes of 700–2300 meters, extending from central Mexico to northern South America.

2. HYDROCOTYLE RANUNCULOIDES L. f. Suppl. 177. 1781.

Hydrocotyle natans Cirillo, Pl. Rar. Neap. 1:20. 1788.
Hydrocotyle batrachioides DC. Prodr. 4:667. 1830.

Stems slender or succulent; leaves 5–80 mm. in diameter, deeply 5–6-lobed, the lobes crenate or lobulate, glabrous, the petiole 1–35 cm. long, glabrous; peduncles glabrous, shorter than the leaves; rays glabrous, 1–3 mm. long; fruit suborbicular, 1–3 mm. long, 2–3 mm. broad, the ribs obsolete.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 226*.

A true aquatic and frequently floating, this species occurs widely in both North and South America.

3. HYDROCOTYLE PUSILLA A. Rich. Ann. Gén. Sci. Phys. 4:167. 1820. Not R. Br. 1820.

Hydrocotyle brevipes DC. Prodr. 4:63. 1830.
Hydrocotyle costaricensis Rose; Rose & Standley, Jour. Wash. Acad. 17:195. 1927.

Stems filiform; leaves 3–20 mm. in diameter, shallowly 5–8-lobed, the lobes crenate, glabrous to villous above, glabrous beneath, the petiole 5–35 mm. long, glabrous to densely retrorse-villous; peduncles glabrous to retrorse-villous, about equaling the leaves; rays obsolete or nearly so; fruit ellipsoid, 0.5 mm. long by 1 mm. broad, the ribs obsolete.

CANAL ZONE: Balboa, weed in Powell's garden, *Standley 28,563*.

A species originally collected near Montevideo, Uruguay, by Commerson, this is now known widely from South and Central America and the West Indies.

4. HYDROCOTYLE UMBELLATA L. Sp. Pl. 234. 1753.

Hydrocotyle umbellulata Michx. Fl. Bor. Amer. 1:161. 1803.
Hydrocotyle polystachya A. Rich. Ann. Gén. Sci. Phys. 4:171. 1820.
Hydrocotyle petiolaris DC. Prodr. 4:60. 1830.
Hydrocotyle fluitans DC. Prodr. 4:69. 1830.
Hydrocotyle scaposa Steud. Flora 26:763. 1843.

Stems slender or succulent; leaves 5–75 mm. in diameter, crenate or crenately lobed, glabrous, the petiole 0.5–40 cm. long, glabrous; peduncles glabrous, usually longer than the leaves; rays glabrous, 2–25 mm. long; fruit ellipsoid, 1–2 mm. long, 2–3 mm. broad, the ribs obtuse.

Valley of Río Panduro, 1500 m., *Killip 3577*. BOCAS DEL TORO: Isla Colón, vicinity of Chiriquí Lagoon, *von Wedel 2955*. CANAL ZONE: Balboa, weed in Powell's garden, *Standley 28,557*; Barro Colorado Island, *Wilson 57, Woodworth & Vestal 565*; Matachui to Las Cascadas, *Cowell 356*. CHIRIQUÍ: Chiquero, Boquete District, 5500 feet, *Davidson 547*; Finca Lérida to Boquete, 1300–1700 m., *Woodson, Allen & Seibert 1151*; vicinity of El Valle de Antón, ca. 600 m., *Allen 1991;* on way to "Palo Alto" (Sierra del Boquete), 4700 feet, *Bro. Maurice 856*. COCLÉ: El Valle de Antón and vicinity, 500–700 m., *Seibert 447*; Penonomé and vicinity, 50–1000 feet, *Williams 403*. PANAMÁ: Corozal Road near Panamá, *Standley 26,819*.

Wet places throughout the temperate and warmer Americas, and apparently adventive elsewhere.

5. HYDROCOTYLE BONARIENSIS Lam. Encyc. 3:153. 1789.

Hydrocotyle multiflora R. & P. Fl. Per. 3:24. 1802.
Hydrocotyle yucatanensis Millsp. Field Mus. Publ. Bot. 2:81. 1900.

Stems slender; leaves 1–12 cm. in diameter, shallowly 12–19-lobed, the lobes crenate, glabrous, the petiole 2–38 cm. long, glabrous; peduncles glabrous, longer than the leaves; rays glabrous, 2–20 mm. long; fruit ellipsoid, 1–2 mm. long, 2–4 mm. broad, the ribs acute.

CANAL ZONE: Chagres, *Fendler 132*. COLÓN: vicinity of Camp Pina, 25 m., *Allen 3593*.

Although originally known from Montevideo and Buenos Aires, this is now reported widely from the warmer parts of the New World. Its proliferous inflorescence in company with peltate leaves is quite distinctive.*

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* The writers are grateful to the curators of the following herbaria for the opportunity of examining their Panamanian material of Umbelliferae: Chicago Museum of Natural History, Gray Herbarium of Harvard University, Missouri Botanical Garden, New York Botanical Garden, United States National Museum.

CORNACEAE

1. CORNUS L.

CORNUS L. Sp. Pl. 117. 1753.

Chamaepericlymenum Hill, Brit. Herb. 331. 1756.
Benthamia Lindl. in Edw. Bot. Reg. *pl. 1579*. 1833, nec A. Rich (1828) necque Lindl. (1830).
Cynoxylon Raf. Alsogr. 59. 1838.
Eukrania Raf. loc. cit. 1838.
Benthamidia Spach, Hist. Veg. 8:106. 1839.
Svida Opiz (Seznam 94. 1852, nom. nud.) ex Small, Fl. SE. U. S. 853. 1903.
Cornella Rydb. Bull. Torrey Bot. Club 33:147. 1906.
Macrocarpium Nak. in Bot. Mag. Tokyo 23:38. 1909.

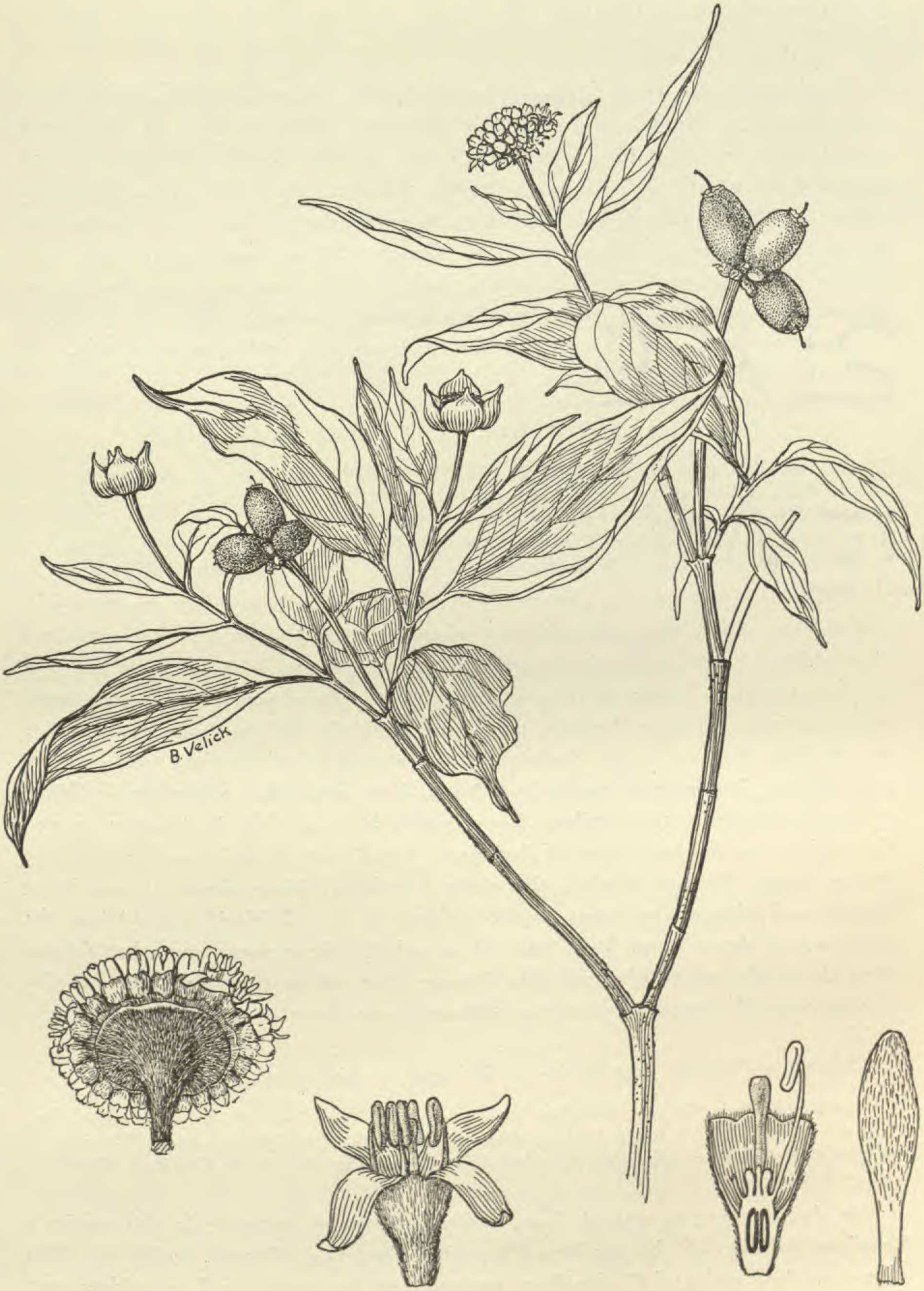

Fig. 108. *Cornus disciflora*

Arctocrania Nak. loc. cit. 39. 1909.
Mesomora Lunell, in Amer. Midl. Nat. 4:487. 1916.
Ossea Lunell, loc. cit. 1916.

Trees and shrubs, rarely rhizomatous subshrubs. Leaves opposite, rarely alternate, estipulate, simple, entire, usually petiolate. Inflorescence an ebracteate corymbiform or umbelliform cyme or (in our species) densely capituliform and subtended by usually 4 involucrate bracts. Flowers small, hermaphrodite, epigynous. Sepals 4, small, slightly united at the base. Petals 4, valvate. Stamens 4, the anthers 4-celled, dorsifixed, versatile. Ovary inferior, 2-celled, each cell with a single pendulous ovule; style 1, arising from a fleshy epigynous disc, the stigma minute, capitate. Fruit a drupe, usually containing a single seed.

About 40 species of North America, Europe, Asia and tropical Africa. A single species is found in Panama.

1. CORNUS DISCIFLORA Moç. & Sessé, ex DC. Prodr. 4:273. 1830.

Cornus capitata Sessé & Moç. Fl. Mex. 28. 1893, non Wall. (1820).
Cornus floccosa Wanger. in Fedde, Repert. 6:101. 1908.
Benthamia disciflora (Moç. & Sessé) Nak. in Bot. Mag. Tokyo 23:41. 1909.
Cornus disciflora var. *floccosa* (Wanger.) Standl. in Field Mus. Publ. Bot. 8:321. 1931.
Cornus disciflora f. *floccosa* (Wanger.) Rickett, in Bull. Torrey Bot. Club 72:223. 1945.

Shrubs or small trees to about 12 m. tall, the small branchlets conspicuously nodose, very finely appressed-sericeous when young. Leaves opposite, petiolate; blade oblong- or ovate-elliptic, acuminate, cuneate, about 7–14 cm. long and 2–6 cm. broad, with 3–5 pairs of ascending veins, firmly membranaceous, above opaque and essentially glabrous, beneath paler and minutely sericeous or tomentellous; petiole about 1–2 cm. long. Inflorescences terminal or subterminal, pedunculate, capituliform, involucrate; peduncle 1–2 cm. long, somewhat accrescent in fruit, minutely sericeous or tomentellous; flowering heads about 1 cm. in diameter, many-flowered, subtended by 2 pairs of deciduous, broadly ovate, sericeous bracts about 5 mm. long. Flowers minute, the ovary and hypanthium about 1 mm. long, densely and minutely sericeous, about as long as the subdeltoid calyx-lobes, the petals white, about 3 mm. long, reflexed at anthesis, the stamens somewhat shorter than the petals and widely exserted. Drupes deep red to purplish black, broadly oblong-ellipsoid, sparsely sericeous to glabrate, up to about 10 mm. long and 7 mm. thick.

Mexico to Panama (mountains of Chiriquí, at high elevations).

CHIRIQUÍ: Bajo Chorro, *Davidson 402*; on way to Palo Alto, Sierra de Boquete, *Bro. Maurice 710*; south of Finca Lérida, *Allen 4767*; vicinity of Finca Lérida, *Woodson & Schery 228*; Volcán de Chiriquí, *Davidson 985*; Casita Alta, Volcán de Chiriquí, *Woodson, Allen & Seibert 793*.

It always comes as a shock for a *norteamericano* to recognize in this species a southern relative of the northern Flowering Dogwood, *Cornus florida* L. The flowering bud scales of *C. disciflora,* however, are far smaller and are seldom seen since they are quite caducous and fall before anthesis. The fruits, only 1 to 3 maturing, are quite showy.